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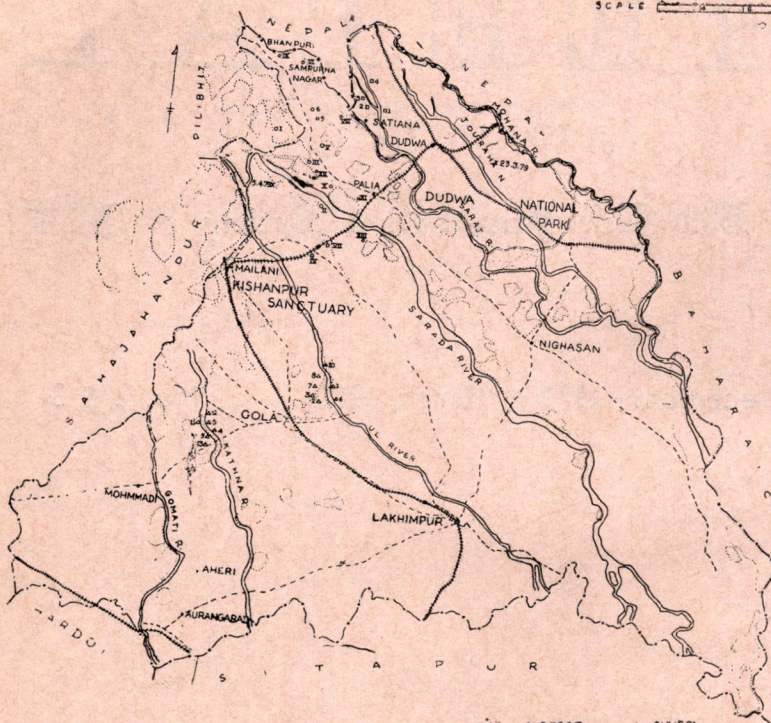
No. 2 & 3

BLACKBUCK & DRONGO

Photo by E. Hanumantha Rao



DISTRICT KHERI



SCALE 1:100,000

DUDWA NATIONAL PARK

S.N.	DATE	ACTION OF VICTIM
1	31.3.78	CUTTING CATTLE
2	8.5.78	PLUGHING FIELD
3	9.5.78	HARVESTING CABBAGE
4	3.7.78	CUTTING WOOD
5	9.11.78	CUTTING FODDER
6	4.12.78	COLLECTING FODDER
7	20.12.78	WORKING IN FIELD
8	20.1.79	COLLECTING FODDER
9	1.2.79	WORKING IN FIELD
10	28.2.79	WORKING IN FARM
11	1.3.79	GOING TO RIVER
12	13.3.79	CLIPPING CABBAGE
13	14.3.79	HARVESTING CABBAGE

TWO MORE BURN KILLS IN APRIL/MAY NOT REPORTED. THE WARRIERS STILL ALIVE IN MAY 1979

KISHANPUR SANCTUARY

S.N.	DATE	ACTION OF VICTIM
1	21.3.78	CUTTING GRASS
2	3.4.78	SEARCHING CATTLE
3	8.4.78	CUTTING GRASS
4	27.4.78	DRINKING WATER
5	1.8.78	CUTTING GRASS
6	2.8.78	WALKING IN FIELD

1000 HILLS, FENCED BY WARRIERS IN 1978. W.F. FOLLOWED RICE INTO CAGE GOT SHOT OF 16.8.78 IN FIELD

GOLA NATIONAL PARK

S.N.	DATE	ACTION OF VICTIM
1	19.3.78	COLLECTING SUGAR CANE TOPS WITH CORN
2	3.4.78	CUTTING GRASS
3	4.4.78	CUTTING GRASS
4	12.4.78	HARVESTING WHEAT
5	14.4.78	SEARCHING CATTLE
6	9.6.78	FLIGHTING WHEAT
7	14.6.78	SITTING AT THE EDGE OF FIELD, CHIPPING CABBAGE
8	22.10.78	CUTTING GRASS FODDER
9	25.10.78	ALONE, ACTION NOT KNOWN
10	27.10.78	CUTTING GRASS
11	1.11.78	COLLECTING WHEAT/GRASS
12	13.11.78	CUTTING GRASS
13	28.11.78	LIVING ON GRASS OR COTTON, RATTING IN OPEN FIELD

WARRIERS SHOT OF MAY 1978 AT CABBAGE, 20.11.78. LEFT 16.11.78. A BURNING CABBAGE ACCIDENTAL KILL

- S.N. SUBJECT SYMBOL
1. BOUNDARY INTERNATIONAL
 2. DISTRICT
 3. R.F.
 4. NATIONAL PARK
 5. RAILWAY LINE
 6. ROAD
 7. RIVER

PLATE I ↑

(See article on Page 3)

PLATE II ↓



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The Prime Minister on Environment

The Prime Minister during April 1980 sent a circular letter to all Chief Ministers, Governors and Lt. Governors emphasising that efforts to preserve the environment were a joint responsibility of the Centre and the States and in fact of all right thinking people. She suggested the following specific measures:-

1. Officers with the right attitude should be posted in reserved forest and sanctuary areas. If possible, a special corps of such officers could be identified for duties relating to wild-life and forest and environment conservation.
2. Forest Development Corporations or similar agencies should be asked to take up plantations on steep hill sides, catchment areas and clear-felled forest areas so that productive forestry and protective forestry go hand in hand.
3. A massive programme of social forestry should be taken up both under the food for work programme and under other specific schemes. The waste lands in villages, all community lands, field bunds, canal bunds etc., could be clothed with fast growing species under this useful scheme.
4. In areas where tribals depend heavily on forests for their livelihood, they should be involved in replanting the species that they are already exploiting. A scheme of forest farming should be undertaken particular attention must be paid to the re-planting on fresh planting of fruit trees.
5. The existing regulations and security arrangements in sanctuaries should be tightened. Poaching should be dealt with very severely.
6. Intelligence machinery to detect smuggling of valuable species like red sanders and sandalwood or of animal furs and skins must be strengthened and personal interest must be shown by top people in administration to see that such activities are ruthlessly suppressed.
7. The system of contracting away forest areas should be replaced or modified to see that every tree felled should be replaced by the planting of at least another one if not more.
8. Tree plantation programmes should be undertaken by schools and other institutions. Some countries have initiated a programme of a tree for every child.
9. Serious attempts must be made to change the orientation of all persons working in the forest services and forest administration with a system of rewards and incentives for those who do better in preserving or extending the forest areas or the wild life areas.

The measures, if implemented in the right spirit will certainly be very helpful. They hold out a ray of hope.

The Kheri Maneaters

A STUDY

by

*S.R. CHOUDHURY & J.P. SINHA

We were requested by Government of India to investigate in a team of three Field Directors, the problem of Dudwa maneaters in Uttar Pradesh. One of the other two members of the team, my worthy colleague J.P. Sinha, Field Director, Palamau Tiger Reserve could join me in the field investigation, May 27-June 4, 1979. J.P.'s probing questions, field interpretations and valuable suggestions were of much help in scrutinising the field data and drawing inferences. In the process, I have been considerably wisened on maneating tigers, even inspite of my nearly half a century experience with tigers and one living with me for the last five years. The problem we investigated was not of Dudwa maneaters but the young and able bodied maneaters of Kheri district outside the Dudwa National Park. We have been wisened on the environmental interrelationships and ecological conditions that may lead to such predation on human beings, not an aberration under physical disability but just picking up the habit.

The alluvial grass lands of Kheri and Pilibhit districts in Uttar Pradesh had been historically great tiger lands. Annual 'takes' from these productive tigers had been consistently high, till the ban on tiger shooting was imposed more than a decade back. During the last two decades much of the tall grass in vast spreads of the valleys has been replaced by equally tall and dense sugarcane. The tiger continues to stay here adapting itself to the seasonally fluctuating heights in the stands of cane, the denser population of farm people and livestock and the mechanised sophistication in cultivation.

In those dynamic tiger areas of terai grassland forests, cases of accidental man-killing had been very rare, and deliberate maneating virtually unknown. Local enquiries confirm that prior to March 1978 there had been no incidence of maneater in Kheri district except in 1952 and 1962 during the large scale reclamation of the terai grassland forests.

Human kills by tigers started again in March, 1978, in three different areas: the Satiana maneater made his first human kill on 2nd March, the Gola maneater her first on 15th and the Sarada maneater his first on 31st. This temporal synchrony was, presumably, an accidental coincidence. For the places of first incidences are: Satiana-Sarada males, 25 km apart, east-west, in two different ecological complexes, and Sarada-Gola male and female, 65 km away north-south (see plate I).

*The first person singular in this stands for the principal author.

Each of these three maneaters killed its first human victim, most suspectedly, in hesitant ambush of misplaced identity through thick cover of tall grass or dense sugarcane. After the first couple of successes these maneaters included human beings in their predatory pursuits. The Satiana maneater, a young male, who was shot after his sixth human kill was in good form without any disability.

The Gola maneater, who we got shot on May 28, 1979, on her thirteenth human kill and personally checked her carcass, was a young female in good health with rich coat and no disability. She had in trail, a 16-17 months old male cub and also at heel a small one 3-4 months old. Incidentally, the younger cub was reported in Statesman of July 4, 1979, to have been captured on July 2, a male too, presented to the Lucknow Zoo by the people of Kheri district. The Gola maneating female was certainly not Tara of Arjun Singh as suspected by some and published. Tara is most certainly dead long back after she went away into the Dudwa forest in mid January, 1978.

The third maneater, named Sarada maneater, reportedly still active in May 1979, was said to be a big healthy male and like all big males he covered a far larger area than either of the two maneaters killed had. He had distinctive pugmarks,—tracings seen by us having distinct outward lean—easy to track, and hence should not be difficult to identify for follow up action as suggested later.

Both the Chief Conservator and the Chief Wildlife Warden, Uttar Pradesh, agreed with us that the most important step to keep up the popular concern for tiger is to remove the most sensitive socio-ecological conflict between the local man and the confirmed maneater, and that too as expeditiously as possible, without any qualms whatsoever, to make sure that it was the maneater only who was eliminated. We felt assured in our discussion with the Chief Wildlife Warden that there would be all out effort to thus remove the Sarada maneater before the onset of the monsoons. The people of the affected area, all those whom we met said, "kill that 'Badmas', only him, and let others live". With him, the third maneater, gone, Kheri is expected to keep off its maneater problem for quite some time, perhaps a couple years, but not for any length as in the past. The basis of this prediction may be ecologically analysed in depth later, hopefully after a longer study in the areas again during early November. It will have significant bearing on the understanding of the Sundarbans maneaters too. However, we give below the analysis of our present findings.

The Kheri district (Plate I) with its headquarters at Lakhimpur in U.P. is a flat country, triangular shape, with its base lying east-west and tip pointing northward. On its northern fringe lies the international boundary between India and Nepal. A considerable length of this international line coincides with river Mohana which enters from Nepal and meanders south-east.

From Pilibhit district on the north-west spreads the rich terai, south-eastward along the natural drainage of Kheri district. The drainage system consists of the main river Sarada which enters from Pilibhit and flows south-east almost medially through the district. All other rivers, six of those, course parallel to Sarada: three—Saraj, Jouraha and Mohana in that order—lie to the north and the other three Ul, Kathna and Gomati similarly to the south. The tract north of Sarada is known as North Kheri and the rest, South Kheri.

The Dudwa National Park in North Kheri is the largest compact block of natural forest bound by river Saraj on its south and Mohana on the north. Between 15 to 20 km away from Dudwa National Park is the other irregularly shaped, large forest block having the Kisanpur Sanctuary. It lies on the North-western end of the district. Midway between these two blocks of reserved forests are shown in the map, a number of sizeably fragmented blocks of Reserved Forests. Virtually all those fragments have been encroached and converted to cane fields in North Kheri and quite some in South Kheri too. One such in South Kheri, the Singharikhurd blocks exists only in two pieces 40 ha and 20 ha on either side of the Sampurnanagar-Hazara road within 10 km south-west of Sampurnanagar. We were told about two tigers living in that 40 ha patch. Would any one believe (?), miles and miles all around is cultivated land, completely open in May-June the time of our field reconnaissance. We made it a point to specially visit the Singharikhurd forest on May 31: a fairly dense, scrubby woodland with high proportion of thorny structure. Inside that woodland we heard the talks of people, presumably collecting wood. Outside it, in the surrounding field with recently planted cane, we saw the evidence of cheetal, wild boar and of course lots of cattle. Down there near the main road, hardly a hundred metres north from the edge of that forest were lolling a heard of buffaloes in a large pool of water under the bridge. To that bridge winds down a dry nala from the western fringe of the forest. On its right bank, proximal to the road, climbs a deeply dusty path into the forest, much used by bipeds and the quadrupeds. At the edge of the forest on this path we saw the clear pugmarks of an adult female tiger impressed sometime the previous night. A tiger indeed who did live there. And if one did, proved by the pugmarks, there was no reason why the other should not be living too as told by the people, in that unbelievably small patch of forest. They were there, but they were not yet maneaters, and they would continue to stay on as long as that shelter was kept in its existing structure and look.

On the previous day, May 30, we had been to an equally, rather more interesting, islet of tiger refuge in the Gadania area of North Kheri. There, about 20-30 km to the southeast of Sampurnanagar is the Tuli farm of one Darbara Singh. The farm house is a modern villa, airconditioned, Mercedes car and with telephone connection. Hardly half a kilometre from the farm house lay to its northeast, a narrow 15-20 ha belt of unreclaimed nala surround of thick markul grass and sporadic *Barringtonia* (fish poison) trees. The thick grass and leafy shrubbery near the water pools in the nala provide comfortably cool retreats for the tiger. Adjacent to

its southern edge stood an overmature crop of cane. In summer it was too warm for the tiger inside the cane. He spent the day in his naturally airconditioned cover of narkul and passed through the cane in his nocturnal prowls. In one small harvested pocket of that cane we saw the pugmarks of a tigress. A fortnight earlier two children of Tuli farm had met two young cubs who had come to water near the pump house irrigation channel running close to their narkul shelter. Virtually all the local dogs in that area had been lifted by the tiger. A young Sardar recently settled on 20 acres land, stayed in his small thatched house closest to the narkul retreat. With great gusto he narrated to us how two of his three dogs had been taken by the tiger, one from under his own string bed. After that he had put a compound fence of reeds. He said that he would now sleep in the courtyard with his third dog tied to the head-end of his cot and a lighted kerosene lamp hung overhead from a small tree. He was marking time for the next visit of the tiger to catch it redhanded and give it the hiding of its life. This young Sardarji symbolised the sportive spirit of his highly adaptive race of Indians who have colonised the erstwhile wilderness of the rich terai of Kheri district, converted it to prosperous cane country yet wanted to rationalise their socio-ecological future with the resident tigers of that land. They were happy with the tiger who controlled the wild pigs in their cane fields. But they had destructive weapons too in guns and rifles which they had been, suspectedly, making free use of to make sizeable dents in the tigers' natural niche. As a result, cattle-lifting even dog-lifting was common and maneating a natural sequence. The aforesaid young Sardarji told us that during last autumn he heard one night the vocal communication of three tigers in different directions from his house. He was sure, all those three had their house in that narkul retreat. And with those two cubs seen by the farm children the productive dynamics in the tiger here must be very high. These proved the fabulous adaptability of this unique great cat to the visibly antipodal change of the natural ecosystem into which it had been ontogenically integrated. It continued to live in those drastically changed environment, apparently with no home and seemingly on nothing. The tiger here was evidently undernourished. But inherently solitary though each be, a number of adult tigers including opposite sexes were perforce to regionally share each limited islet of diurnal cover and mixedly forage in their respective command zones. Prolonged nearness to the male or exposure to his androus pheromone, may induce frequent oestruses to make an unencumbered female biologically receptive to the male, proved in Khairi my tigress foster daughter. Population growth rate would increase contrary to Malthusian principles. The tiger would have to seek for unusual food, dogs and with growing courage, human beings. This was what was revealing in the Kheri tigers. It would be still more clear in the case histories of the aforesaid three maneaters of Kheri.

Satiana Maneater. a Young male:

On March 1, 1978 this young male had been seen by the Wildlife Warden, about 2 km

east of the Satiana Forest Rest House. The Wildlife Warden informed the local departmental labourers.

1. Next day at 5.00 P.M. a labourer named Akbar of Muradabad was cutting narkul grass in an island near Kawaghatia, nearabout the place where the Wildlife Warden had seen the tiger. Twenty labourers taking bath in the river heard the groan of Akbar. They rushed and found him being dragged away by the tiger. With heavy growls the tiger put them back on their heels. They came back to fetch more than 200 labourers from the camp at Satiana. Seeing them the tiger left the dead body. It was brought to Satiana camp. The tiger followed at a distance. Near the camp he saw two bullocks loosely tied to the wheels of a cart. At 6.30 P.M. he mauled one and killed the other which he dragged 40 m away into the bush. Next morning he was seen at the kill. The Wildlife Warden inspecting in the vicinity of the kill that afternoon saw that young male again on the road. The tiger appeared on the road unconcerned about the jeep and stood his ground a few metres from the jeep. The jeep had to back out. That young male was apparently a very bold animal. He ate the kill for three days.

2. On April 3, 1978, Dharamdutta Pandit, a Nepali, went to search for his cattle, 5 km to the north of Kawaghatia. He did not return. Search next day found his blood stained cloth on the bank of Nagrol nala. In the nala the pugmarks of a female with a cub were seen. She might have shared the kill of the young male, who was presumably a subadult cub of her earlier litter.

3. On April 6, 1978, one Padam Bahadur, 40 years old Nepali, had come to cut grass in Amargarh compartment 5A, within 1 km from Nagrol nala. He did not return. Search next morning found dead body partly eaten. It was pulled under a tree on which people sat watching. The young male came. People on the tree broke small branches and threw those on him, shouting. In spite of it the tiger pulled the dead body into the cover.

4. On April 27, 1978, Birja, aged 40, a mafidar of Tharu forest village went to put out the forest fire. During the work he went down to drink water in Newra nala, 2 km upstream of kill No. 3 above. The young male caught him by his head and dragged him away into the bush. Later his pugmarks were identified at the site of the kill. Subsequent search found the dead body eaten from its lower end.

At this point let us state the departmental action to tackle this maneater:

After the second kill regular baiting was started in the area. The kills were being sizeably used by the female with the cub and perhaps shared also by the young male. Human kills stopped after the fourth. It was therefore presumed that the maneater has been localised, hopefully to be reformed thus gradually. Baiting was continued till the end of

June. Incidentally no confirmed maneater would be localised that way, nor could it ever be reformed to give up its habit.

After the fourth kill there was no other maneating by the Satiana maneater till August that year. We may mention here that in all the cases of the three maneaters of Kheri district there had been generally gaps during the rains, ecologically perhaps because of higher success ratio in predation on natural prey under more favourable ambush conditions and also because of lesser opportunities in getting human quarry when the cane fields were less frequented by people. The Kheri maneaters, as we have stated earlier, were able bodied tigers in normal health who acquired the habit of including human being as their natural prey. Frequency in maneating would be correlated to the opportunities in ambushing human beings. Such opportunities would be wider spaced when the human beings got more and more alerted to the danger of maneater. This was the further reason why the Satiana maneater could not make any human kill after the fourth when people started shying away from the danger area, and bait was provided within easy reach.

5. On August 1, 1978, Ram Lakhan, aged 50 years, was cutting grass near the cane field in Tej Singh's farm at Dalnagar about 12 km to the west of Satiana Forest Rest House. Next day his body was found partly eaten.

6. On August 7, 1978, 32 years old Labh Singh, village Semri, went out on his motorbike to see if his jute needed harrowing. He left his bike on the road and entered the field. The tiger took him. A little later his younger brother found his blood stained turban in the field. Search got the remains partly eaten. Evidences in the field revealed that as Labh Singh entered the field the tiger stalked him skirting forward in the adjacent cane, caught him frontally by his head and dragged him away. Clearly it was the pattern of boldness of the young male displayed in his earlier kills around Satiana at the outer edge of the Dudwa National Park. This young male had followed the niche of deer (swamp deer, cheetal and hog deer) from the inner edge of the park to the young paddy in those open fields. And as opportunities came by, he made the afore stated two kills.

Subsequently the pugmarks of that maneater used to be found in the area of the said two human kills hardly 2 km apart. The pugmarks were not of a full grown male. It was, therefore, suspected to be a big female. Bait was tied in the area. The first was taken on 11th. The kill was dragged and placed under a tree with a view to dart and immobilise the maneater. It could not be done. When the second bait was taken three days later, the Wildlife Warden and a Sardarji sat up on a machan with the 'Dist-inject' gun and a heavy rifle respectively. As they sat on the machan waiting for the tiger, that young male was found stalking along the road side cane, the children returning from school on cycles. When the children were sharply told about the tiger they threw down their cycles and ran back to the people on the road. The tiger continued walking ahead in the cane on the road side.

As he passed in front of the machan the dart from the 'Dist-inject' gun missed him, but luckily the heavy rifle got him. He was a young male in good health, and no defects. He met a very premature death because of the inexperienced and indiscreet boldness of an upcoming appetitive young.

Sarada maneater, an adult male:

At the outset we would like to mention that at each of his earlier kills during the period March 31, 1978 through November 9, 1978 this maneater had been suspected to be a female and thereafter it has been recognised as a male. Two tracings of recent pugmarks taken with the tiger-tracer clearly showed that it was a male with a sharp and distinct outward lean in its pad and inward twists of its toes. Such mistakes in sexing is possible when a young sub-adult male starting predation is not full grown and filled up to give the definite look of a male, particularly in fleeting glances. This young male had not yet fully developed paws too in the same way as of the Satiana maneater. The earlier mistakes in sexing him is thus explained.

1. On March 3, 1978, Kalu Bhagat, aged 60 years, was cutting tops of cane for cattle fodder. While doing so he reached too close to the tiger hiding in the cane. The tiger pawed him on his head, but left him and ran away when his wife near him shouted.

2. On May 8, 1978, Dharam Singh, 40 years old, was ploughing his field near Sarada river in Piparia village, close to the riverain forest. The tiger attacked and killed him near the boundary line and dragged him into the forest.

3. On June 9, 1978, Sunder Lal, a labourer in Murada beat was harvesting cane in the field adjoining the forest boundary. The tiger attacked and killed him.

4. On July 7, 1978, Wahidan, 45 years old, was cutting wood in the forest by the side of Bhira-Malani P.W.D. road. The tiger attacked her from the back but was shooed away by others. She died in the hospital.

5. On November 9, 1978, Ram Avtar, aged 45 years, went to his field and did not return. Search revealed the pugmarks, suspectedly, of a female (evidently of the young male) on the common boundary of Ram Avtar and Vikram Singh's cane fields. A sickle and some cut 'jeytee' plants were found *in situ*. Police was informed. Further investigation found blood stained cane leaves in Vikram's field and later the skull and some bones.

6. On December 16, 1978, Kartar Kaur of Sampurnanagar was accompanied by her husband to their field. There she went to the cane field to collect fodder for the bullocks. While doing so she was attacked by the tiger. On hearing her cries people gathered and searched. They soon found her lying unconscious.

7. On December 20, 1978, one Jaipal of Baura beat, Kisanpur Range went with Ramswarup to do some work close to the forest. The tiger attacked Jaipal and dragged him away. His bones and torn underwear were recovered on the following day.

8. On January 13, 1979, Ramlal, aged 35 years, of Bishunpur went to the cane field to collect the fodder for his buffaloes. He did not return. Search next day along the drag line and blood trail in his field led to the remains of pelvic bone, a few pieces of long bones and the sickle.

9. On February 7, 1979, Sriram of Khajuria, Sampurnanagar, went to work in the cane field near the Indo-Nepal border. He did not return. Search found his skull and some bones.

10. On February 28, 1979, Itwari, aged 50 years, of village Padua near Tekonia was working in the farm of Jogender Singh. The tiger killed him and while dragging him away other labourers chased shouting and recovered the dead body.

11. On March 2, 1979, Kisorilal, 13 years old, was working in the field of the Pradhan of Altaria village. While he was moving towards the river in the cane field, the tiger caught him and killed him. His dead body was recovered with three deep canine holes on the front and back of the head.

12. On March 13, 1979, three Sikh brothers were working in the Bardaya farm close to the forest. The elder brother was cutting the canes and the middle, Badar Singh, was cleaning those with the help of the youngest. The tiger rushed out from the forest and grabbed Badar by his scalp and as he started dragging him away the oldest and the youngest beat the tiger up with the canes. The tiger left, but Badar did not survive. Later a beat was arranged wherein a number of tractors were mobilised to press the tiger into rope nets. He took three nets into the cane. No one dared enter the cane to capture. The tiger could bite his way out of the nets.

13. On March 14, 1979, seventeen years old Ram Avtar of village Majhaura-Bhira, was cutting cane in the field at 11.00 A.M. His companion labourer came and informed the villagers that the tiger caught Ram from the back and had taken him away. Search at 2.30 P.M. revealed the body with one leg eaten.

Those were the 13 reported cases which had been documented by the Wildlife Warden. We were told during our field enquiry that there had been two more recent cases not reported, one involving a Nepali labourer which was suppressed in order to prevent the spread of terror among other farm labourers, and the other concerned an unknown outsider who was passing through the forest.

The Sarada maneater was still at large in May-June, 1979, not yet enough wisened about its human prey nor bereft of the fear of the human being. He should hence be easy to remove before he became cunning and bolder.

Gola maneater—A Young Female

The Gola maneater was a resident female, in the Gola Reserve Forest close to the east of Gola town. The Gola forest is linked north with a narrow corridor along river Ul to the earlier stated larger block with Kisanpur sanctuary (see Plate I). It is the home of a number of other resident tigers too. Formerly, it used to be surrounded by widespread private owned grasslands with sprinklings of mixed forests. Much of those grassland forests have been converted to cane. Only a few small bits are seen to-day sticking in patches to the sides of the Gola reserve forest, mainly along river Ul. On the bank of Ul exist the narkul, *Barringtonia* and a host of other evergreen shrubbery, the same pattern of tiger retreat as described earlier. Within the reserve, sizeable areas have been converted to *Eucalyptus* and yet others to teak. There are stretches of natural grassland with mixed forests and considerable spreads of original sal forest. The entire area is prone to heavy annual fires and pressurised with equal intensity of grazing by domestic cattle. Large areas of the forest remain submerged through the rainy season, thus reducing, significantly, the available forest area. At the time of our inspection we found no area, except along the narrow belt of the river, which had any cover worth the mention, and no ambush cover for the tiger. We found evidences of cheetal and wild pigs, actually saw a sizeable herd of cheetal in a sal forest near Gola. In a harvested pocket on the edge of standing cane, J.P. detected the pugmark of a tigress within 50 metres from the main road. She had apparently passed through the sal and started stalking in the field taking the standing cane as the ambush cover.

About 12 km to the west of Gola town is the isolated patch of Kathna Reserve Forest fringed on its eastern side by river Kathna. It is a principally sal forest with completely open floor and very little, virtually nil, of wild ungulates. The Kathna river holds a long stretch of tiger retreat of dense evergreen scrubs interspersed with *Barringtonia*, Jaman and other evergreen trees, plus cane brakes. Kathna is apparently used as a camping out predation range, at least the Gola maneater had used it in such manner.

Because maneating used to take place both in the Gola and the Kathna forest which are nearly 15 km apart over open country it had been presumed that there were two maneaters, each operating separately in those reserves. But 15 km is no distance for a tiger to cross over at night, which in the 50's a number of tigers used to do right through the Bhawanipatna town in Kalahandi district of Orissa, to cross over from Sinang forests to Dhangda-dhangdi R.F. over a distance of more than 15 km through densely populated open country under cultivation.

In the course of follow up departmental action to eliminate those supposedly different maneaters, a male was shot in Gola forest on November 18, 1978 and a female there on December 6 the same year. The salient fact which must have inadvertently escaped notice in the then prevailing anxiety to eliminate the maneaters was that, after the female was killed there was a human kill to the east of the Gola forest three weeks later on December 27.

The Gola maneater evidently operated both in the Gola and the Kathna forest as would be apparent from the catalogue here below.

1. On March 15, 1978, Bhagwan Din, a labourer went to collect tops of sugarcane, cattle fodder, at the edge of narkul in the Ul river. He was found next morning completely eaten up. Near his remains, a few bones, were found the decaying remnants of a wild boar earlier killed by that tigress. She was with a young cub. It was suspectedly an accidental kill when the man went too close to the tigress with the cub. A beat was organised on the 16th morning. It did flush the tigress but ended in the mauling of a man.

2. On April 3, 1978, Nokhelal a member of Gola municipalty left his bicycle with his shirt placed on it and went in to start cutting grass down the shallow Barauchha nala, not far from the cycle. The tigress took him. His remains, a few bones, were found on the 6th.

3. On April 4, 1978, the tigress killed another labourer, Chetram, while he was cutting grass a kilometre upstream of kill No. 2, in full view of two other grass cutters who could chase her away and retrieve the dead body.

After the third kill the Gola maneater shifted to the Kathna forest.

4. On April 12, 1978, Jhau was harvesting wheat very early in the morning in his field close to the Kathna river. Others of his village were at some distance in their own fields. The tigress came from his back and dragged him into the cane brake. At 7 A.M. others came to have a smoke with Jhau. They did not find him, but they saw the drag and the blood trail. Dead body was found at mid day, at the end of 100-150 m drag, dismembered and half eaten.

5. On April 14, 1978, Chote Das, aged 45 years, had gone out to search his cattle. He did not return. Search in the forest found his partly eaten leg and his head 1 km to the west of kill No. 4.

Next day on April 15, the pugmarks of Gola maneater were seen by J.S. Chauhan, D.F.O., Pilibhit. Close to those pugmarks were the smaller ones of a three months old cub.

6. Her next kill was in the Gola forest on June 9, 1978 close to the outer bank of river Ul. Sibram, a labourer, was cutting grass or fishing, when the tigress took him. His only other companion ran away and informed the villagers in the evening. Search next morning revealed the dead body dragged across the river into denser cover. Only one leg had been eaten.

7. On October 14, 1978, Kailash, a labourer from Gorakhpur was sitting 200 m from the Gola R.F. boundary. He was chewing sugarcane when the tigress lifted him into the cane cover. Next morning very little of remains of the man was found, but close by was lying a fresh kill of a wild boar.

8. On October 22, 1978, Duber, a labourer was cutting grass fodder near the Gola forest. The tigress caught him from the back and dragged about 10 m, but left when others made a hue and cry and tractors came in. The dead body was thus retrieved.

9. On October 25, 1978, the tigress killed again in Kathna forest and ate up Ram Adhin. Details of predation have not been documented.

10. She shifted next to Gola forest and on December 27, 1978, killed Tauley, aged 40 years, of village Chandrapur who had gone to cut grass on the northeastern side of Gola forest and did not return. Search next day revealed leg bones, chappal, sickle and underwear.

11. After the 10th kill the Gola maneater shifted finally to the Kathna forest and remained there presumably after dropping her litter, till she was shot on May 28. On February 1, 1979, 45 years old Lakshman went to collect Mallotus fruits in the Kathna forest. He did not return. Search next morning found his blood stained cloth. They also saw the small cub of the tigress.

12. On February 13, 1979, Chetram went to Kathna South compartment 3. While he was cutting grass the tigress killed him at mid day. His partly eaten dead body was found later 20 m from the spot of killing.

After the second kill in the month of February 1979, in the Kathna forest on the 13th, regular baiting was started on the north end of river Kathna. The tigress had a tender cub which had been seen, as stated earlier, at the kill on February 1. Later, after her death, we could surmise from evidences that her cub of the previous year whose pugmarks had been seen by Chauhan on April 15, 1978, was also with her. The tender cub which was seen by the people must have been dropped in the Kathna shelter in early January. The tigress naturally got stuck to the baits. Plate II reveals the enlarged teats of the tigress, partially wet when she was shot on May 28, 1979.

The possibility of immobilisation had been considered, but the tigress had always taken the bait and eaten it only during night time. The follow up search after darting had had little prospect of success in finding her in time. Radio telemetric darts could have made it feasible. It was not available with the Wildlife Organisation of the department. The Daggada maneating panther had been earlier captured in an iron-barred trap and brought to Lucknow zoo. It had, therefore, been thought that the same trap could be used to capture the Gola maneater. We saw that trap. It did not appear to be properly camouflaged. The iron bars were too loud. The bait chamber was separated from the outer chamber by an iron bar partition. No tiger would enter such a trap which the panther would because he is used to entering hutments to steal goats and calves etc. However, on one night the hungry tigress had put her front paw in through the outer bars of the bait chamber and

eaten by clawing out portions of the limbs of the live bait. Baiting and attempt to capture were relaxed from mid May. The tigress went hungry.

On May 28, 1979, morning we went to inspect Kathna forest in the company of R.L. Singh, the Director of Dudwa National Park and N.P. Singh, the local Wildlife Warden. As we entered the forest along its boundary at the edge of Sashiaganj (alias Sahabganj) colony, one village boy came running to our jeep followed by others, and in breathless voice told us that his father had been taken by the maneater early that morning. It happened as follows.

Some time in the small hours that morning the tigress left her cubs at the edge of the forest and stalked nearly 200 metres in the open field of that village (see Plate III) to three bullocks tied to stakes in that field. She killed two. The third escaped with mauling. At that time Ram Das was sleeping alone in the open near his standing cane and the diesel pump, about 150 metres at a slant from the bullocks and 100 metres from the edge of the forest. With the noise of the bullocks killed, Ram Das must have woken up and his movement, perhaps voice too, must have drawn the attention of the tigress. The tigress left the dead bullocks, rushed towards Ram Das, grabbed and dragged him away to the forest. Close placed, multiple canine marks on the face and neck of the dead body of Ram Das clearly indicated struggle. Ram Das was, therefore, awake before the maneater took him. Early in the morning the villagers saw the mauled bullock and the dead carcasses, and tracking onward they found the empty bedding of Ram Das, the drag and blood trail. They followed the trail over the open field, through the open sal forests, nearly one kilometre, till they came into the dense evergreen cover near Kathna river. Spooring further on they disturbed the tigress. She had by then severed the right leg from the hip and eaten a portion of it including the genital organ. When she was disturbed, she left that leg and started pulling away the dead body. People chased. The tigress left the dead body under a Jaman tree at the edge of an opening.

We were taken to the leg and then the dead body. The leg was carried to the dead body to get the photograph (see Plate IV).

We saw the pugmarks of the tigress and of her younger cub. We saw also a third pugmark of the size of a big tigress but more compact which I overlooked although J.P. questioned about it. I was under the influence of the 'search image' in the local information that the tigress was with only one small cub.

Ram Das left behind 12 children. His eldest son doing B. Com., was sitting near the dead body of his father. My first suggestion to R.L. was to feel the possibility of keeping the dead body for the tigress to return in the evening. This is usually done in the tribal areas in my state. But here the people did not agree. The cover into which the tigress

had gone with her cub was apparent. Suggestions to beat her out also fell through. The only other alternative left was the ruse of a drag to a convenient stake under a Jaman tree in the open and the strengthening of the stimulus with a live bait to attract the hungry tigress. We fetched one of the carcasses of the dead bullocks to the dead body. The dead body was removed. The carcass was dragged to the stake. A machan was put up on the Jaman. Assistant Conservator of Forests, Mahinder Singh, was given detailed instruction to sit up on it by evening with one other person to flash the spot light. We then left for Dudwa.

Next morning we were informed at Dudwa that the maneater had been shot at ten minutes to eight the previous night. We came back to see. We were told that with much hesitation, uncertain about success, arrangements were made as instructed by us and by 6 P.M. the A.C.F. was on the machan. The tigress came a little past quarter to eight. straight to the spot where she had left her human kill. Her movements were heard in the machan. A couple of minutes later she rushed out and killed the bait. She was shot, broad side on, through her neck.

Streams of people were coming on to see the dead maneater, a great relief for the local people. They were addedly convinced and more happy when the autopsy revealed the genital organ of the human kill still undigested in the stomach, more than 12 hours after its ingestion by tigress. Although the rest of the human leg and hip had been digested leaving only small bits of long bones, the genital organ could not be digested because of its protective skin which takes much longer time to melt in the tiger tummy than the usual two to three hours with raw flesh. It was definitely the maneater indeed, and that made the people feel much assured. As stated earlier the carcass of the Gola maneater had no defects externally and none internally either. She was a young female, healthy but a little thinned in famish.

We then went to the machan where she had been shot. There we found the live bait which had been killed by the tigress, missing. The villagers of Sahabganj had told us that after the maneater had been shot and brought away, they had heard frequent calls of the cub during rest of the night. The call of a small cub which is a soft 'ku—uning' would not be heard at that distance in the village. It must, therefore, be the deep low 'aaoonh' of a bigger animal, the first suspicion about her grown up cub of previous year, which Chauhan had seen on April 15, 1978.

At the machan we found the bait killed by the tigress had been wrenched off breaking the rope, and dragged straight about 200 metres into dense cover to the northern edge of river Kathna. There it had been opened around the belly in oval shape, cutting into the abdominal skin and the lower thoracic ends of the ribs including a part of the sternum, in the manner of a panther. No panther exists in such area in the open valleys of Kheri

district. The use of carnassials heavier than of panther was apparent in the coarse cuts of the belly skins and, more so, of the rib ends. The pugmarks on the drag looked the size of a big female, slightly bigger than of the maneating female, but more compact and squarish. Clearly those were of the older cub, a male 16-17 months old who did not have developed denture to open the carcass at its fleshy rump like an adult tiger does. He, therefore, had opened it in the way more convenient to his denture. It was him who the villagers had heard calling his mother. He had apparently taken care of his younger brother too. Waiting in the bush he must have seen the happening with his mother from the machan, but, evidently, not aware of her removal. He called her and then pulled away the killed bait to feed himself and to feed the younger cub.

We dragged the carcass out to the open under a Jaman tree which had no red ants, put up a machan on it and tied another live bait to a stake near the carcass. The Director, Dudwa National Park, the Assistant Conservator and a labourer waited on the machan with 'Dist-inject' gun, sunset through 9 P.M. We waited some distance away in the forest with electric torches. There was a pale quarter-moon in the sky with enough light to see movements. The arrangement was: if that subadult came to the bait and were darted, the machan would signal us with the spot light and immediate search would be conducted in his flight direction. He did not come. The moon went down. All of us came back at 9 P.M. After giving instruction that the Wildlife Warden and the A.C.F. should keep watch on the two cubs particularly the bigger one and feed them regularly we drove back to Dudwa reaching there at past midnight.

Three days later on June 1, on our way to Lucknow, we checked with the Wildlife Warden and the Assistant Conservator of Forests at Gola. They said that after we had left on the 29th night the bait was killed and dragged across the Kathna river into thick dense cover. Next morning when they found it so, they tried to locate the carcass which was not possible even with the elephant, so very thick was the cover and slushy the ground. On subsequent days they had made abortive attempts to comb the area, as far as practicable to capture the cubs. That day on June 1, when we met them at past lunch time, they said that they had just returned after conducting a beat in the forenoon. They also said that they had been told by some of the villagers that early that morning they had seen a young male tiger chasing a nilgai calf in the open field to the south. It was, undoubtedly, the older cub of the Gola maneater. For no tiger would chase a quarry like a cheeta, except, perhaps, an inexperienced adolescent. We urged both the Wildlife Warden and the Assistant Conservator, particularly the later exclusively in charge of the operation, to keep continuous watch on the cub and try to fix him with repeated baits with a view ultimately to capture him and the younger one too. His chasing the nilgai clearly indicated that the bait he had taken on the 29th night had been finished and hence he was out to get some fresh food.

The news item in the Statesman on July 4, mentioned earlier, made us feel happy that the younger cub had at last been captured and sent to Lucknow zoo, 35 days after the death of his mother. He would not have survived that long, particularly with the evidence of the partially wet teats of his dead mother, unless he had been taken care of by his older brother. We hope the older one has been fixed as advised. In order to emphasise this aspect of 'operation follow up' after the death of the Gola maneater, I had specifically gone back from Lucknow to Gola on June 4, — — J.P. had left for Ranchi on the 3rd — — to impress its importance on the Wildlife Warden and Assistant Conservator of Forests at Gola.

Discussions and suggestions

In the narrative thus far in this report, general ecological conditions existing, the history of change in eco-system during the last two decades, the change in the socio-ecological relation between tiger and man, the adaptation of the tiger to the changed conditions and the tolerance of the human colonisers to the tiger have been briefed. Significant events and evidences have been cited and broad based inferences have been drawn to suggest some immediately urgent remedial measures. We discuss now the ecological conditions and the problem of the maneater, and suggest remedial measures as appear to us necessary and feasible.

Most of the tigers in the problem areas, the open populated valleys of Kheri district, are historically resident tigers. Seasonal shifting does take place of a few from the peripheral regions of Dudwa National Park, who follow their niche, like the Satiana maneater did, to the crop fields. However, the Dudwa or Kishanpur tigers would not move deeper into crop fields because of the resident population who must be jointly advertising their possessive scent flags in the area. Later in this, we will be discussing more about the Dudwa tigers.

The resident tigers in the valleys have weathered through severe changes in their habitat structures. In the replacement of the dense and natural grassland by equally dense and tall sugarcane the habitat physiognomy has had no significant visual variations for the tiger. On the other hand it is perhaps more convenient for the tiger to move and rest in the systematically raised cane. The tiger is equally as efficient in ambushing its prey in the cane as it used to in the natural grass. An increasing drag, however, is apparent in the decrease of its natural prey animals. Pigs would thrive on all cane and so would also the deer on tender cane, young field crops and the available natural forage. The last named, however, is under severe pressure of heavy grazing by cattle. These natural prey populations in the area are, suspectedly, decimated by gunning in the crop fields, may be noosing too; and in the natural forests and grasslands, their population growth is retarded under heavy pressure of grazing cattle. On the other hand, the population of tigers, as stated earlier, is increasing faster than normal because of environmental condensation of adults in the available shelters and retreats along the rivers. Search pattern for food has spread over larger areas in criss-

cross overlaps. In such an ecological condition there could be no defined territories which would have had some influence in making the tiger population 'density dependent'. The tiger has to take cattle and dogs, particularly in the lean season. The inexperienced young and more apititively bolder tigers may include human beings in their list of prey species as is seen in the history of maneating by the three maneaters of Kheri district.

The tiger by nature is afraid of human beings. Ablebodied tigers may take to maneating under ecological conditions as obtain in the Kheri district of U.P. But such maneaters would not be heavily dependent on human prey like it happens with a disabled tiger taking to maneating. In Kheri district maneating by the young healthy tigers may start accidentally and later turn opportunistically incidental as described earlier. All the same, the tiger becomes a maneater, and once it has picked up the habit, the future events are no more accidental but predictable, i.e., maneating is expected to take place some time and some where in the area of its operation, evident in the history of three maneaters of Kheri district. Such predictable ecological events that seriously alieniate man to tiger should be forthwith removed by pinpointing the maneater. No fancy attempt should ever be made to localise or reform a meaeater, nor should there be any undue emphasis in trying to immobilise or capture otherwise.

We would mention here that on that day, May 28, local villagers, crowds of men, women and children, many pitiaibly crying their hearts out, had gathered around the dead body of Ram Das. A number of villagers who had been affected by the Gola maneater complained to the Wildlife Warden, with a hint of accusation, that he did not shoot the maneater when there had been enough chances while she had been taking the live baits. Had he done so, instead of trying to capture it, Ram Das would not have been killed. We were told by the Director, Dudwa National Park, that at the peak of maneating incidences in the cane fields, the cane growers had even bluntly told him that they were prepared to pay the compensation of Rs. 5,000.00 to the family of any one of his men offered to the maneater, in order to make him feel how it feels when one's kith and kin, even co-villagers is killed by tiger. This challenge indicates the trend of relationship between man and maneater. Clearly, the maneater should be eliminated at the very first opportunity. To do that, it is necessary to pinpoint for follow up action.

We would, therefore, strongly recommend, rather insist, on the first important step to constitute a mobile 'Tiger Watch' under an experienced Wildlife Warden with two Assistant Wildlife Wardens, one for north Kheri and the other for south Kheri, and adequate number of field staff to continuously keep watch on the cane country tigers of Kheri district, who are systematically susceptible to add human beings to their prey species. They must also keep an eye on the peripheral tigers of Dudwa National Park and the Kisanpur Sanctuary and the Chandia-Hazara block. They must know each individual, study the conspecific associations

and watch the growth rate in population dynamics. They should continuously study the interspecies relationship including with man. Regional increase in tigers which may tend to become incompatible with the food and area has to be 'culled' ultimately as a resource to be encashed in the market, but initially be captured to meet the requirements of all zoos. Any incidence of man-killing by a tiger which may lead to turn it to a maneater has to be carefully watched, the animal pinpointed and expeditiously eliminated. After having studied the history of maneaters in my home state, Orissa and learning more about them from the Kheri maneaters, I am of opinion that if necessary the kill may be poisoned to make sure the removal of the maneater. A maneater must not be given any chance to become wiser about the ways of human hunters. It should not learn to become machan conscious like the older cub of the Gola maneater did. It should not learn about the danger in returning to its kills.

Pure accident in man-killing is often apparent in the event itself. One such happened in the Barbeta Compartment No. 6 of Sonaripur Range at the northern end of Dudwa National Park. On March 23, 1979 one cowherd named Gunu of village Dhusia in Dudwa National Park was returning in the evening with his buffaloes. He was following them close on their heels. At Mohansena the tiger caught him from his back. The villagers came back to search with electric torches. His dead body was found with partly caten hip. The tiger did not kill anymore human beings. It was suspectedly a case of accidental killing in the camouflage of the buffalo herd moving in front of him. The second accident happened on April 5, 1979 while a beat was being conducted in Sarada Compartment No. 6 of Kisanpur Range. Unknown to the beaters the tiger lying in that area broke the beat and in the process killed Ram Charan, one of the beaters. Such accidents as these can be identified from the sequence of events that lead to the accidents. The tiger may not turn a maneater.

While dealing with the problem of maneaters in Kheri district, non-maneaters had been shot as stated in this report, all because of the urgency to remove the problem and also because there was not enough experience and systematically close watch on the tigers. Experience will be auto-generated in the personnel specifically alerted in the 'Tiger Watch', confidence will be its natural corollary.

Things should not wait till the formation of the 'Tiger Watch'. There are some which need immediate attention, besides the removal of the Sarada maneater.

The dog-lifter of Tuli farm has to be removed, not by shooting. It is getting too much involved, intimately, with human homes. Increasing familiarity may breed contempt. For it, man-lifting may not be far. Like a panther it is robbing from hutments. It can, most probably be trapped in a cage, the same cage which failed with the Gola maneater. Put it on the compound fence with its mouth opening flush to the fence. Camouflage the sides and the top with the same reeds used in the fence. Leave a small opening at the top to allow the

lantern light on the sacrificial dog. Remove the barred partition between the entrance and the bait chamber. Trip the drop-gate. The dog-lifting tiger will be tricked into captivity.

The older male cub of the Gola maneater should also be captured. He had had long association with his maneating mother. When full grown as an adult, he may take to maneating, notwithstanding the punishment he has seen on his mother.

Residual tigers in the Gola forest should be kept under continuous vigilance. There is an old, not too old, male here lovingly named as 'Baba' by the local people. We have mentioned about the pugmarks of the female which we saw in the cane field on May 27. Most likely, there are others too. These should be watched. The tiger retreats in the Kathna forest should also be intermittently checked for pugmarks.

At least ten molecules of deer refuge, of minimum 10 ha each, should be strategically fenced with cattle exclosures—a plain wire 0.5 m from the ground and three barbed wire stands in the next 1 m, total height 1.5 m. This may be suitably done also in the Kathna forest. Circular fence would require the minimum perimeter.

Gang cutting of grass and cane fodder should be resorted to and lone cutting by single individual avoided, particularly near the forest and the tiger retreats. In the pattern of life here, these may appear impracticable, but even so there is no harm in persuasive cautioning. In any case, accidents could be minimised in the pockets under such operation by loud warning to the uninitiated tiger to move away if it be within vulnerable distance. This habit could surely be inculcated in the people.

The cover conditions in the tiger retreats and their unapproachability in some pockets would prevent complete clean up of tigers in the cane areas of Kheri district. There could perhaps be a way to decrease, which may ultimately finish the resident tigers in much of the cane regions of Kheri by putting tiger exclosures around all tiger retreats—a 3.5 m high fence. But such an extreme step which may appear plausible would possibly be fraught with many unpredictables. The fabulously adaptable species such as the tiger may find tolerable cover in suitable pockets of the summer cane. It may take to wider wanderings with temporary covers found on its way. In either case the chances of human encounters would increase manifold, and so would, with it, the propensity to maneating. If on the other hand there were efflux towards the larger forest blocks, the intraspecies tension and stress conditions would ensue in the ecotonal belt at the periphery of those forests adjoining the cane fields. Seasonal influx of tigers from those belts would penetrate deeper into the cane country. The problem of maneaters may rebound.

Complete extermination of the resident tigers in the cane region of Kheri district, even if it were done with massive clean up operation without erecting the aforesaid exclosures, the resultant vacant niche, so very viable in the cane, would not remain unoccupied

for long. It would be colonised by increasing number of transients thrown out from the two large blocks of forest in Dudwa National Park and Kisanpur Sanctuary. The future of tigers in the cane of Kheri district should, therefore, be rationalised and managed in the way suggested earlier, ultimately as a resource which will pay for its upkeep to ensure its perpetuity.

A word of caution: The 'Tiger Watch' will be a paid body to look after the Kheri tigers. It should be able to pinpoint and eliminate a maneater. In doing so it should never be exposed to the temptation of trophy hunting by an individual. All parts of any maneater killed should be government property. In due course, however, when the technique of tiger management is mature enough to deal with the tiger as a resource and there is excess growth for marketing, the commercial removals shall be guided only by the 'Tiger Watch', not by any private Shikar Agency. The Chief Wildlife Warden had told me that prior to our visit he had been approached by a foreign tourist to permit him to shoot the Gola maneater, only to shoot and no trophy, and he offered to pay Rs. 2,00,000.00 for the privilege. That indicates the value of the resource. Ten years of commendable protection to wildlife given by the Wildlife Organisation of U.P.—we had been with some of its devoted personnel in the field—tigers and panthers have increased and with them have come problems like those narrated earlier. The Chief Wildlife Warden told us about some of the hill forests which are also threatened by such problems. We, therefore, feel that it is time to start learning how to manage these great cats in the present day conditions and their future trends. Experience with the Kheri tigers will generate such learning. The 'Tiger Watch' should hence be methodical and its documentation systematic, under experienced and discreet guidance. It should not be influenced by pseudo-conservationists, pretenders who harp on the patent theme of noninterference without realising that the essence of conservation is knowledgeable management, not sentimental preservation. It should have an open mind, discrete enough to assess, take stock of the actual factors and influences that govern the behaviour of the Kheri Tigers.

The northern side of Dudwa National Park is, as stated earlier, bordered by the International boundary with Nepal. This international boundary continues west on the fringe of the cane valley of North Kheri. In Nepal, a wide belt has been cleared just across the border, all along the boundary, for the settlement of their ex-army personnels. Status of tiger and incidences of maneating, if any, beyond the border, in Nepal, is not known. The 'Tiger Watch' may collect such informations as relevant to the future monitoring of the tiger management, particularly of the border tigers who use both the countries. Bilateral problems may crop up mainly on the periphery of the cane valley, rarely any along the Dudwa border. To appreciate the latter one has to see the Dudwa National Park. We did not see much of that Park, but what little we did sample of its variety and interspersed, was enough to confidently predict as above.

Dudwa National Park is a precious gift of natural area to the nation by the U.P. state. In legally constituting it as a National Park the state government have foregone an ecologically croppable annual revenue of over 2 crores (20 million). On its southern side exist wide belts of alluvial grasslands along the river Saraj, the residual of what used to be the picture in much of the open valleys of river Sarada and its tributaries, the then thundering range of many thousands of gond (swamp deer). The remnant of that range which is left in Dudwa holds still enough space for a very large population of gond which has perhaps the highest 'condensation potential' among all the deer in this country. In Dudwa they are coming up fast under conservation management, not just protection alone. We say 'conservation management' because watering places are being artificially provided 3 to 4 km apart, at double the 'cruising radius' of the herds; controlled fires are purposefully applied in pockets to cut down mature coarseness and stimulate tender regrowth in the tall grasses; mature grass is also being allowed to be cut and removed in patches by the people, here again to promote tender regrowth. Some of the herds which used to earlier shift for summer lack of water in the range and the rains growth of tender blades attracting them to the crop fields did not move out after the facilities as above were provided in their own home ranges.

The commensalistic interrelationships between coarse, medium and tender feeders are well known to the elementary ecologist. Bovines, particularly the gaur and the buffalo are coarse grazers. So are the rhino and also in some ranges the elephant too in this country. They cut down the coarse grass to render the regrowth available to the deer. Larger deer-like gond and sambar do take some coarser grass but not to the extent the bovines do. In the absence of bovines, 90 percent of the grassy resource in a range may waste unutilised. Productivity in the community biomass of grazing animals is therefore increased manifold in mixed populations of bovines, deer and other bovids. The advantage of such mixed users over the harvesting and removal or burning of coarse grass is the immense value of the nutrients recycled through the dung dropped in the range as against its export in the harvest or oxidation in the burning.

Dudwa has the structural properties and their spartial disposition to viably accommodate and ecologically integrate multispecies animal communities with the inclusion of rhino, buffalo and gaur. These could be easily introduced to replicate similar communities as in the alluvial grass lands of Kaziranga. Controlled grazing with biennially or triennially shifting cattle exclosures in the southern periphery of the Park would be ecologically acceptable and socio-tactically desirable for the Park's relationship with the local man.

In my discussion with the Chief Wildlife Warden of Uttar Pradesh I was happy to learn that he was aware of and prepared to take all the above stated bold steps which could be expedited but for the uneducated objections of some of the so called wildlife experts who

were out to decry everything that was done with honest purpose in Dudwa. The height of such, may I say, 'malicious pretention' is the statement that forest fires chased the Dudwa tigers out to become maneaters. They won't. If they did, the tigers in Similipal which used to get thrice licked by forest fires every summer, would swarm out into the surrounding plain forests and cultivation to look for human beings and their cattle, which they never did. These pretending pseudo-conservartionists do not have the capacity to visualise, nor do they have the open mind to enquire about the grassland fires that used to formerly sweep the alluvial plains in the Kheri before those were converted to sugarcane. As stated earlier, we were told that in those days Kheri used to produce annual yeild of a large number of warrantable tigers and no maneater. Fire protection in Dudwa is as intensive as anywhere under adequate surveillance. But fire is also an effectively constructive tool in thehands of a practising ecologist which the worthy managers of Dudwa National Park are using judiciously. Dudwa is thriving, not dying as maliciously told by some in the press, and it may soon become a model of well managed natural area in this country.

I have discussed with the Chief Wildlife Warden, U.P. about two action programmes on Dudwa vis-a-vis the Kheri maneaters relating to seasonal influx into crop fields of the tiger niche followed by its predator from Dudwa. I have stated earlier about the Satiana maneater who had followed thus and killed two people in the cane field. There is a proposal to fence the southern fringe of the Dudwa National Park with a deer incloser, to prevent movement into the crop field. Such a fence would be very expensive. Before putting any such artificial barrier it would be better to create conditions within the range to ecologically arrest the seasonal shifting. This has been successful in pockets where tender regrowth of grass was purposefully established with fire and by manual harvesting and also providing water within reach. I wondered, audibly, about the expansion of such facilities in larger belts all over the alluvial grasslands of Dudwa. The Chief Wildlife Warden voiced what I was about to suggest: apply mechanical harvesters, benefit the people with harvested grass and stimulate the tender regrowth for use by the deer. The deer will stick on as they have in the pilot experiments. And with this alternative available in their natural habitat repellents from the border crop fields would effectively scare them back to the forest. Every elementary behaviourist knows that no machine would disturb the wild animal unless its sound is associated with physical pain. The animals get adapted sooner than could be imagined. These machines would ultimately be discarded, perhaps in two decades, when the bovines and the rhinos take over their function.

The other item of action programme in the conversion of the *Eucalyptus* to dry land grass. There are about 700 ha of this exotic standing in harvestable crop in Dudwa. This foreigner has no ontogenic relationship with the local biota. No useful relationship has developed in its association with the indigenous animals. Dudwa has been taken out of commercial forestry, for good. The *Eucalyptus* has no use in the indigenous biotic communi-

ties in a National Park. It should, therefore, be encashed by uprooting and the cash ploughed back to create dynamic grasslands for the deer, blackbuck and nilgai. The two, last named, can also be usefully introduced. Such grasslands have been created in some of the Tiger Reserves, noteworthily in Palamau with phenomenal success. In Dudwa there are no wild dogs. The Tiger-panther-deer association should hence be far more dynamically productive here, than in a number of our other wildlife reserves infested by the dhole.

The tiger and panther populations existing in Dudwa are good. With purposeful management as suggested they will soon increase to optimally fill up the range. No fanciful display should ever be repeated to captive breed and rehabilitate any of these super predators. Two boys were killed by panthers so attempted to be introduced into Dudwa in the past. The 19 months old tigress Tara, once badly mauled by a resident tigress, rescued and subsequently lost in Dudwa has apparently been naturally eliminated, not rehabilitated in nature. For had she been existing, she would certainly have been seen and photographed to prove the claim. No super predator can be rehabilitated that way. The lion rehabilitation so much published in Elsa was a total failure. My five years old foster tiger-daughter Khair¹ may continue to move freely in open forest during brief periods under watchful studies. She is not intended to be rehabilitated in nature. All of us know how the Tara episode maligned all captive tigers in the name of Kheri maneaters. In future this should not happen.

Postscript

I met the Chief Wildlife Warden, U.P. on August 4, 1979 to get the details about the younger cub of the Gola maneater.

He told me that ever since we had left in the 1st week of June, the wildlife staff had been searching for the cub all over the Kathna forest. On June 26 they found two small cubs lying in a pit, a couple of hundred metres to the north of the place where we had put up the machan on May 29 to immobilise the older, the 16-17 months old cub of the Gola maneater. One of those two cubs in the pit, an emaciated female, was dead. The other, an equally run down male, was breathing. He was brought to Gola by the Wildlife Warden who tried to revive him with milk and vitamins. Three days later he was brought in a jeep to Lucknow zoo. The cub died the same day. The important treatment for revival was evidently forgotten in the success in the find of the lost cubs. Those cubs had been lying in the pit for nearly 3 weeks with no food and water. They might have had taken some bites from the bait killed by their brother on June 29, night. On June 1, the older cub had been found chasing a nilgai calf towards the southern end of Kathna forest. Prowling further south he had, suspectedly as would be evident later, lost touch with those younger ones. The two tender siblings must have rambled out crying for their mother and got trapped in the pit. The first important treatment that was necessary would be for dehydration in veinous feed by glucose in saline drip or injection. Equally as important was the need for his rest, not the

exhausting transport to Lucknow. I state these here to caution any such future action, while I am all praise for the commendable success in finding the cubs in an area where it was well nigh impossible.

I saw the skin, skull and lower jaw of the male cub. The carnassials and the canines, and also the size of the skin were of a 4-5 months old cub. The cubs did not have any food for over 3 weeks. Their growth would naturally stagnate during that period. The cubs had, therefore, been dropped in mid January as stated earlier in this study. On May 28, we had seen only a few pugmarks of the Gola maneater with a couple of those of her cubs. We had hence taken those as of one cub as per local information.

The Chief Wildlife Warden told me about a sad incident with a tiger on July 2, 1979, in village Aheri, 8 km to the west of Karake R.F. which is 20 km to the south of Kathna R.F. On July 1-2 night, the tiger prowling in the vicinity of the village must have wandered into a bamboo grove near it and there got stuck at day break. At 2 P.M. on July 2, some of the villagers saw the tiger in that grove. They called others from the village. One Pandit Amarnath went with his gun. He reached within 2 m of the tiger and while sitting down aiming to shoot, the tiger charged, killed him and bounced back into the grove. Police was informed. Two armed constables came. The villagers had cordoned the grove. They put fire to it, all round, by throwing dry cane leaves. All of a sudden the tiger came out running. One Harikaran Bajpai of the village came in the way of the running tiger. He got a slap on his shoulder and later died in the hospital.

In the meanwhile the officer-in-charge, Mikelganj P.S. came there. He drafted all the available guns in the area. He then sat up on a machan and about 150 rounds of gun shots were fired from the opposite side into the grove. No tiger came out. No tiger was found either, later in the search. Evidently it had escaped. The pugmark skid, traced from mud, looks oversized, of a young male. No resident tiger in that area would lose his way in the manner of this, apparently a stranger. It was hence, most suspectedly, the older cub of the Gola maneater, and if it be so, surely he is wiser for the worse now about the strength and stature of the dreaded human being. It would also explain how and why he lost touch with these two younger cubs.

About the Sarada maneater, I was told by the Chief Wildlife Warden that on July 13, 1979 morning, one Rahametulla of village Sesabara-gadania had gone with his buffaloes to graze them in the Chandpura block. He did not return. Search next day till noon got no trace. Police was informed. That same evening some other graziers of that village said, they had seen the remains of a human skeleton and ribs in Chandpura block. Rahametulla must have been killed by the tiger. On 15th the police tried to reach the spot which lay in between two branches of Sarada. They could not because of high flood. All efforts are being doubly mounted to eliminate that maneater. We wish them speedy success.

Note: The Sarda maneater has also been eliminated in nearly 1980.

A Study on Statistical Ecology of *Crocodilus Porosus* in Estuarine Tract of Sundarbans

By KALYAN CHAKRABARTI

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1 INTRODUCTION:

Sundarbans is a proverbial name in the forest map of the world, with tigers on land and crocodiles in water. Each component of life in this unique ecosystem exhibits an incredible array of adaptations. Sundarbans supports a marshy terrain of diverse ecosystem wherein tidal fluctuations promote a rapid circulation of nutrients, waste products of metabolism, and benthic microflora. There are both horizontal and vertical variations in salinity indexes in this unique tract. Sunderbans is really a complex biotope in a richly variegated, highly colourful household of nature where fish (*Periophthalmus* and *Boleophthalmus*) creep up the tree, tides in the same creek sometimes run in opposite directions, molluscs and crustacea are in abundance. The crocodiles (*Crocodilus Porosus*) operate in such a peculiar saline terrain and their behavioural pattern and adaptations are simply astounding.

2. ABSTRACT:

In this a paper, number of biometric and morphometric measurements of *Crocodilus porosus* were taken to find out if there is any significant variation in any of the characters for both the sexes, male and female. Two different sets of samples, one consisting of 8 males and 16 females and the other sample consisting of 5 males and 11 females form the domain of study. Length, weight, snout length, skull length, tail *etc.* were measured for each individual crocodile and statistical analysis of the data collected was made to find out if any of the characters significantly differ in male and female counterparts of same ages. It could be ascertained from the study that only weight and tail lengths of male crocodiles exhibit statistical significance over those of female crocodiles while other characters like length, snout length, skull length, do not exhibit any statistical significance between the sexes, male and female. Analysis of the data derived from both the samples gives the same conclusions. As such weight and tail length of crocodiles can be taken as indexes of discrimination for male and female crocodiles (*Crocodilus porosus*) of the estuarine tract of Sundarbans.

3. STUDY DATA:

The tables (1 and 2) show the data of 8 males and 16 female crocodiles (Table 1) and 5 male and 11 female crocodiles (Table 2) with respect to their length, weight, snout, length skull length, and tail length. These 40 crocodiles which were reared at Bhagabatpur crocodile

farm of Sunderbans were released in the tiger project area of Sunderbans. 24 crocodiles (8 males and 16 females) which were born in August, 1977 (data as per Table 1) were released on 12th May, 1979 and the observations as per Table 1 were recorded on the same data before release and 16 crocodiles (5 males and 11 females) which were born in August, 1976 (data as per Table 2) were released on 11th May, 1979 and the observations as per Table 2 were recorded also on the same data before release. In order to find out if there is any statistically significant discriminant character between the two sexes, t-test of hypothesis was applied for each of the character with respect to the data obtained from both the samples. The basic assumptions made for testing of this hypothesis are:

- (1) that in each population the characters are normally distributed.
- (2) that the unknown population standard deviations of the distributions of characters are equal and
- (3) that the sample observations in each set are random and mutually independent, one set being independent of the other.

In this testing of hypothesis, we are to test the null hypothesis $H_0: (\mu_1 = \mu_2)$ against all alternatives $H: (\mu_1 \neq \mu_2)$ where μ_1 and μ_2 are the population means of two characters under study, the test criterion can be formulated as,

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s^1 \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ under null hypothesis which follows}$$

$t = \text{distribution with } n_1 + n_2 - 2 \text{ degrees of freedom.}$

Where $\bar{x}_1 = \text{sample mean of the character with respect to one set.}$

$\bar{x}_2 = \text{sample mean of the character, with respect to other set under comparison.}$

n_1, n_2 are the sizes of samples which for the first sample are 8 and 16 and for the second sample are 5 and 11 in the present case.

$$\text{and } s^1 = \left\{ \frac{(\sum x_{1j}^2 - n_1 \bar{x}_1^2) + (\sum x_{2j}^2 - n_2 \bar{x}_2^2)}{n_1 + n_2 - 2} \right\}^{\frac{1}{2}}$$

Where x_{1j} and x_{2j} are the individual observations for the first and second sets of the sample.

4. Computation of Index of Discrimination and Testing of Hypothesis

Let us now proceed to find out the test criterions for testing of hypothesis and hence to determine the index of discrimination between male and female crocodiles.

(A) ANALYSIS OF DATA FROM TABLE I.

(1) Data on length:

From the data the following are calculated as follows:

$$\bar{x}_1 = 122.625 \quad \Sigma x_{1j}^2 = 120915$$

$$\bar{x}_2 = 116.625 \quad \Sigma x_{2j}^2 = 213752$$

$$S^2 = 28.35$$

$$\text{and } t = .489$$

Comparing this with table values of t ,

$$t_{.075 \text{ with } 22 \text{ degrees of freedom}} = 1.360$$

$$t_{.05 \text{ with } 22 \text{ degrees of freedom}} = 1.717$$

$$t_{.01 \text{ with } 22 \text{ degrees of freedom}} = 2.508$$

So, H_0 is accepted as the observed $t (= .489)$ is far less than those of table values at 7.5%, 5% and 1% levels of significance. In other words it may be concluded that male and female crocodiles can not be discriminated with respect to criterion of length.

(ii) Data on weight :

From the observed data, the following are calculated:—

$$x_1 = 7.106 \quad ; \quad \Sigma x_{1j}^2 = 425.1725$$

$$x_2 = 5.809 \quad ; \quad \Sigma x_{2j}^2 = 574.2225$$

$$S^2 = 1.5886$$

$t = 1.885$ which was found to be significant at 5% level of significance, and we are to reject the null hypothesis $H_0: (\mu_1 = \mu_2)$. In other words it may be concluded that weight of male crocodiles is significantly more than that of female crocodiles and as such the weight may be taken as an index of discrimination.

(iii) Data on snout length and skull length:

Similarly test criterions for both snout length and skull length were computed which are as follows:

$$\text{Observed } t \text{ for snout length} = 0.17$$

$$\text{Observed } t \text{ for skull length} = 0.29$$

Both of these t -values are found to be non significant even at 7.5% level of significance. Null hypothesis in these cases are to be accepted.

Table 1
DATE OF RELEASE : 12.5.79

Sl. No.	Male with date of birth in August, 1977 (C. porosus)					Female with date of birth in August, 1977 (C. porosus)				
	Length (L) in centimetre	Weight (W) in kilogram	Snout Length (S.L.) in Centimetre	Skull Length (SK.L.) in centimetre	Tail length (T.L.) in centimetre	Length (L) in centimetre	Weight (W) in kilogram	Snout Length (S.L.) in centimetre	Skull Length (SK.L.) in centimetre	Tail Length (T.L.) in centimetre
1	125	8.0	12	21	67	120	7.0	12.0	20.5	64.5
2	128	8.0	13	21.5	68	128	8.0	13.0	21.0	69.0
3	128	8.0	13.5	22	66	107	4.0	11.5	18.5	57.0
4	128	7.0	13	21	68.5	101	3.5	10.0	17.0	53.0
5	129	9.0	13.5	21	68	119	6.5	18.0	19.0	53.0
6	128	8.0	13	21.5	67	128	7.0	13.0	20.0	68.0
7	108	4.5	11.5	17.5	56.5	113	5.5	11.0	19.0	58.0
8	107	4.35	11.5	18.5	56	106	3.5	11.0	17.8	56.0
9	124	11.0	12.0	22	63	125	8.0	13.0	20.5	66.5
10	121	11.0	14.2	23	65	113	5.0	11.5	19.0	59.0
11	121	11.0	14.2	23	65	112	5.5	11.0	18.0	58.0
12	122	8.2	12.0	23	65	125	7.5	12.5	20.5	66.0
13	142	8.2	12.0	23	65	117	5.6	12.0	19.5	61.0
14						126	6.4	13.0	20.0	66.0
15						104	4.0	10.0	17.0	55.5
16						122	5.95	12.5	21.0	63.5
Average 122.625 7.106 12.625 20.5 64.625 116.625 5.809 12.1875 19.269 60.875										

DATE OF RELEASE : 11.2.79

Table II

Table II
DATE OF RELEASE : 11.5.79

Sl. No.	Male with date of birth in August, 1976					Female with date of birth in August, 1976				
	Length (L) in centimetre	Weight (W) in kilogram	Snout Length (S.L.) in centimetre	Skull Length (Sk.L.) in centimetre	Tail length (T.L.) in centimetre	Length (L) in centimetre	Weight (W) in kilogram	Snout Length (S.L.) in centimetre	Skull Length (Sk.L.) in centimetre	Tail Length (T.L.) in centimetre
1	145	9.5	15.0	22	72	114	3.5	12.0	19.0	61.0
2	151	11.0	14.5	22	72	135	7.0	14.0	21.5	70.0
3	154	11.0	15.0	25	73	144	8.5	15.0	24.0	70.0
4	140	8.5	14.0	23	70	144	9.0	14.5	24.0	70.0
5	141	7.5	15.0	21	71	153	6.5	15.0	24.0	72.0
6						141	8.0	14.5	23.5	70.0
7						136	7.5	14.0	21.5	70.0
8						138	8.0	14.5	22.0	70.0
9						130	11.0	14.0	20.5	69.0
10						125	5.5	14.0	20.0	68.0
11						151	6.5	14.0	24.0	72.0
Average										
	146.2	9.5	14.7	22.6	71.60	137.36	7.36	14.136	22.18	69.27

(iv) Data on tail length

Similarly t-value on tail length was computed which is found to be 1.63, a value greater than table value of t at 7.5% level of significance (=1.360) at 22 degrees of freedom. So H_0 is to be rejected in this case and tail length can be taken as an index of discrimination for male and female crocodiles with a fair degree of accuracy.

(B) Analysis of Data from Table 2

The following table shows the observed values of t against different characters:

Character	Observed value of t	Remarks on statistical significance
Length	1.61	Significant at 7.5% level of significance
Weight	2.146	Significant at 5% level of significance
Snout length	0.275	Not significant even at 7.5% level of significance
Skull length	0.79	
Tail length	1.67	Significant at 7.5% level of significance Not the value greater than that of length

Table Values of t

$t_{7.5\%}$ level of significance with 14 degrees of freedom: 1.377

$t_{5\%}$ level of significance with 14 degrees of freedom: 1.761

Thus comparing the observed values of t with those of table values it may be concluded that the characters weight and tail length may be taken as statistical indexes of discrimination to discriminate male crocodiles from the female ones.

Computation of Correlation Coefficients:

From the table 1 and analysing the data, the following correlation co-efficients could be computed for male crocodiles:—

	Length	Weight	Snout length	Skull length	Tail length
Male					
Length—	—	0.9547	0.88	0.956	0.987
Weight—	—	—	0.8435	0.918	0.939
Snout length—	—	—	—	0.854	0.823
Skull length—	—	—	—	—	0.924
Tail length—	—	—	—	—	—
Female					
Length—	—	0.94	0.581	0.919	0.878
Weight—	—	—	0.566	0.872	0.815
Snout length—	—	—	—	0.295	0.152
Skull length—	—	—	—	—	0.864
Tail length—	—	—	—	—	—

It is thus evident from the above tables of correlation Co-efficients that while in case of male crocodiles, length maintains statistically significant correlations with weight, snout length, skull length and tail length and weight with snout length, skull length and tail length and snout length with skull length and tail length and skull length with tail length but in case of female crocodiles the correlation co-efficients of length with weight, skull length and tail length and of weight with skull length and tail length and of skull length with tail length are only statistically significant but all other correlation co-efficients are not statistically significant.

6. Conclusion

The statistical analysis of the data tends to indicate that the characters, weight and tail length may be taken as indexes of discrimination for male and female crocodiles (*Crocodilus porosus*) in the swampy tract of Sunderbans. Such bio-ecological studies on *Crocodilus porosus* were never made in this estuarine tract and as such this might throw some light into hitherto unknown biological properties of this fast dwindling species namely *Crocodilus porosus*. Similar detailed studies on this species in Sunderbans and in other areas might be interesting to confirm this present observation.

7. Acknowledgements:

The author is indebted to Shri B.K. Bardhan Ray, I.F.S. Conservator of Forests, Wild Life, Government of West Bengal for giving encouragement to write this article.

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Wild Encounters on the Darjeeling Himalayas

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On a sultry, humid and exhausting June evening of Calcutta, a team of young Zoologists from Zoological Survey of India, left the busy Howrah Railway Station for Darjeeling, the land of Rhododendron and Pines and emerald green valleys of Tea veiled with mist and fog. From the New Jalpaiguri Railway Junction, road journey on a truck was preferred, instead of the joyful ride on the fascinating Toy Train, for cumbersome baggage of field equipment and also to save time. But, alas, the trouble with the four wheeler, delayed the journey as well as brought discomfort to the whole team.

It was midnight, when we reached our then destination called Ghoombhanjang—some 2 km west of the famous place Ghoom which happens to be one of the highest placed Railway Station of the World. Amidst the prevailing fog and mist accompanied with heavy shower, we could manage to locate the youth hostel, our temporary abode.

The hostel, a big wooden hall furnished only with two long planks on either side of the wall offered the sleeping place. The windows, two in number, in the room have most of their glass pans broken to allow the chill wind to blow in. Before we could settle to retire in our uncomfortable beds drenched enroute, and amidst the monotonous concerts of the cicades and other insects and also the triking of rain drops, suddenly we all were alarmed with a 'Cry' from the jungle—a reminiscence of the cry of a suckling human baby. After a repeated listen to that cry we realized it for a call of the Giant Flying Squirrel. In the subsequent evenings, we managed to locate those animals and collected a number of them. We found to our satisfaction that already three species, have been collected namely, *Pataurista magnificus*, *Petaurista nobilis* and *Petanista elegans*. On the fourth day we left for Manebhanjang, below Sukhia Pokhari, where the Ghoom range meets the Singalila range.

In fact on that field trip our primary object was to investigate and collect Pika or Mouse-Hare in and around Sandakphu. In 1958, a joint team of Zoologists from the Harvard and Yale Universities of U.S.A. and Zoological Survey of India, procured a single specimen of Mouse-Hare from Sandakphu, the identity of which was rather puzzling. Our mission was mainly to conduct thorough investigation on that particular kind of Mouse-Hare.

After reaching Manebhanjang, we could manage to proceed towards Sandakphu on the same day but in a different vehicle. Our journey was hindered by occasional failure of

the engine of the vehicle, caused due to torrential rain pouring down unceasingly. The situation was becoming alarming with the failing daylight as it was approaching towards the evening. We decided to desert our vehicle at a place called Gouribas, where from the team could trek the remaining path in order to give a sort of relief to the vehicle which might be able to carry our baggage a bit comfortably to the destination. Under that awfully inclement weather, we climbed the steep elevation of about 11 km and finally reached our goal exhausted and thoroughly drenched amidst the prevailing darkness under the overcast sky.

After a frantic search for the Mouse-Hare, we succeeded only after four days to locate their abode and could comfortably collect specimens and carry out investigations. This Pica or Mouse-Hare, *Ochotona* sp. was in fact abundant in that area. We also managed to collect sundry others small mammals like Sikkim Vole, *Pittimys sikkimensis*, Fulvascent Rat, *Rattus fulvascens*, Smokebellied Rat, *Rattus eha* and Darjeeling Whitebellied Rat, *Rattus niviventer monticola*. We came across a pack of wild dogs which had incidentally slain a mule of a trader who, stayed over for the night on his way to Darjeeling. Trails of Himalayan Black Bear were found in the jungle. During the period a number of avian species were collected and also a pair of the Lammergeir, *Gypaetus barbatus* was observed, residing somewhere in a nearby cliff.

Somewhat satisfied with our job with the Mouse-Hare we left Sandakphu for Palmajua, a place much down below the slope on the Little Rangeet watershed, which enriched forests all around. Here, at Palmajua, despite the gloomy weather which intermittent rain, we managed to keep the spirit of our field activities alive. We could bag a few more of the Darjeeling Whitebellied Rat, *Rattus niviventer monticola* which turned to be toptotypical material, since Palmajua happened to be the type locality of the species. A few more Flying Squirrels and Himalayan Stripped Squirrels had also been collected. On the fourth night of our stay at Palmajua, when in the jungle, waiting impatiently for at least a brief cessation of the rain and disgusted with leaches attracted from all the directions, suddenly a mild coughing bark came from a nearby tree, which could be judged as within some 20 feet or so from us. All our receptors, spontaneously become alerted arms ready to take a shot. But it was necessary to ascertain the identity of the animal. In fact it was not clear to us with that little clue we could have from that brief sound. Unfortunately, our flashlight failed to work, possibly due to interference of the rain water that soaked the cells. After slight movement, we heard a big thud over the bushes and on the ground and the animal escaped into the thicker jungle without revealing its proper identity. The next morning, however, we discovered big pug marks along with faeces of a large leopard on the ground close to the place of that incident. Another puzzling situation encountered during our stay at Palmajua was about a Kalij Pheasant.

Darjeeling district happens to be within the intergrading zone of *Lophura leucomelana leucomelana* and *Lophura leucomelana melanota*, the former having a whitish breast while the later having a black breast with semilunar white marking in the rump. The specimens observed belongs to none of them, rather having a complete black body. Shortly after the discovery of the pug marks, we were a bit cautious in our movement. Possibly for that reason only we had a glimpse of the Kalij amidst the ferns. Bewildered with its plumage we failed to take any shot, both with Camera and gun. On several other occasions we had seen the similar Kalij in Palmajua but without any positive success. Later, it was learnt that Black Kalij, *Lophura leucomelana mofitti* has the identical plumage which we have observed in Palmajua. Unfortunately we could not confirm it for the lack of material. More interesting is that the whereabouts of the Black Kalij is not yet known. They were described from cage birds shipped from Calcutta and said to have come from somewhere in Eastern India, more particularly in Assam south of Brahmaputra and not from the Himalayan Jungle.

Despite the over all success in that trip, the unsolved mystery of the Kalij is still haunting our minds.

From Members

DO LEOPARDS USE THEIR WHISKERS AS WIND DETECTORS

By

RAZA H. TEHSIN

I had an opportunity to witness a peculiar behaviour of a big male Leopard in the hilly tract of Udaipur.

My father and we three brothers were sitting over a hillock and admiring four Sambar (*Cervus unicolor*) does and two grown up fawns grazing peacefully in a clearing on the face of a hill about 200 yards from us. Between us and the Sambars, there was a belt of a scrub jungle and beyond there was a dense Jungle. They were on a higher ground from us. We were engrossed in watching when suddenly my elder brother caught sight of a Leopard in a depression, between us and the hinds about 80 yards from us, stalking them. A good breeze started from our direction towards the hinds. When the Leopard was about 70 yards from them and almost level with us the does became uneasy. He crouched there for about five minutes occasionally raising and slightly turning his head sideways, his whiskers taut and relaxed alternately, which I could see clearly with the help of a Binocular. Then the Leopard turned and retreated for about 30 yards towards our right side and disappeared, reappearing again over the bank of a dry Nullah and started stalking over a comparatively barren ground. Soon he was detected by a hind. She advanced two or three steps towards the Leopard followed by another two other hinds, gave a loud bell and all of them dashed into the dense Jungle. The Leopard rose from his position took two step, raised his tail, gave a woogh and went off.

From this incidence I inferred that these big cats know the importance of wind and use whiskers as a tool to detect wind direction.

I would therefore be grateful if some naturalists throw more light in the matter.

(See Page No. 47 for Shri S.R. Choudhary's letter)

Wildlife and its Conservation in Gujarat State

By M.A. RASHID IFS.,

Addl. Chief Conservator of Forests, Wildlife, Gujarat State

INTRODUCTION:

Although the State of Gujarat, with barely 10% of its total land area under forests, stands included among the forest deficient regions of the country, it is still fortunate enough to possess quite a rich variety of wild fauna comprised of about 40 species of mammals and over 425 species of birds as compared with the 500 species of mammals and 3000 species of birds occurring in the country as a whole. Some of the species found in Gujarat, such as the Asiatic Lion and the Indian Wild Ass, are indeed unique in that they do not occur elsewhere in the country. In fact, the Gir forest of Gujrat at present constitutes the only abode of the Asiatic Lion and represents the last remnant population of lions in the wild outside the continent of Africa. The Wild Asses are confined mostly to the little Rann of Kutch. Among the other more important species of wildlife found in Gujarat may be mentioned the Tiger, Panther, Sloth Bear, Cheetal or Spotted Deer, Sambar, Muntjac or Barking Deer, Indian Antelope or Blackbuck, Chousingha (the only Four-horned Antelope in the world), Bluebull Chinkara or Indian Gazelle, Wild Boar, Wolf, Striped Hyaena, Muggar or Marsh Crocodile Great Indian Bustard, Florican, Flamingo, Pea-fowl, Grey Jungle Fowl, Partridge (grey, painted and black), Quail, Green Pigeon, and a large variety of water fowl and birds of prey.

STATUS OF WILDLIFE IN GUJARAT—PAST AND PRESENT:

In the pre-Independence era, most areas of the States were teeming with wildlife—particularly the erstwhile princely States where hunting for sport was the jealously guarded prerogative of the royalty and their distinguished guests. Punishment for poaching was summary and severe, damage to wild life on this account was negligible. The luxuriant moist deciduous forests south of the Narbada covering the districts of Dangs, Valsad, Surat and Bharuach, as also parts of Vadodara, Panchmahals, Mehsana, Sabarkantha and Banaskantha districts and of Saurashtra and Kutch abounded in the above mentioned species of wildlife. The attainment of Independence and the subsequent abolition of princely States, however ushered in a chain of events which soon proved disastrous to our wildlife and resulted in its wide-spread and uncontrolled decimation. Owing to the predominantly agrarian economy of the State and the insatiable public demand for land required for cultivation, cattle grazing and a host of development projects, which our popular Governments were in no position to resist, huge chunks of valuable forests, which also formed the natural habitat of wildlife, were cleared and diverted to other uses. As the

forests rapidly disappeared under this relentless pressure of man and beast, the frontiers of wildlife also receded and wildlife populations continued to dwindle at an alarming rate. Further, with the abolition of the princely order which had hitherto acted as an effective deterrent against poaching, the general public in the merged territories celebrated their newly won freedom by indulging in wanton slaughter of wildlife. The situation was further aggravated by the liberal issue of licences for so-called crop protection guns to villagers under the grow-more-food campaign by the successor popular Governments as a matter of political expediency. Actually, most of the firearms were misused for commercialized poaching on an unprecedented scale by indiscriminately slaughtering game over waterholes during the hot summer months even when there were no standing agricultural crops to protect. With every agriculturist up in arms against it and in the total absence of an enlightened and organized public opinion in its favour, it was only a matter of time before our unfortunate wildlife was persecuted almost to the verge of extinction.

CONSERVATION OF WILDLIFE IN GUJARAT:

Unlike several other countries, conservation of wildlife in India has all along been the responsibility of the Forest Department, with the Police Department sporadically lending a helping hand in the nonforest areas where no forest staff was posted. In the early stages, even the wildlife legislation was applicable only to the forests which were in charge of the Forest Department. However, the strength of the forest staff was far from adequate and it was too overburdened with its forestry activities to pay any serious attention to the protection of wildlife, even though on paper this was very much a part of its normal duties. Moreover, as a part of the former unwieldy composite State of Bombay, the Gujarat region was sadly neglected in the matters of both administration and allotment of funds for development. It was only after the birth of a separate State on 1st May 1960, that Gujarat could come into its own and rise upto its full stature as a dynamic and progressive entity. The Government of the newly formed State soon noted with grave concern the precarious plight of its forests and wildlife and took several timely and far-reaching measures to conserve its dwindling renewable natural resources including wildlife which effectively stemmed the rot that had set in by gradually setting right the serious ecological imbalance which had resulted from the previous neglect and abuse.

(a) The first step in this direction was to give immediate protection to those pockets of forest which still contained wildlife in appreciable numbers by legally constituting them into Sanctuaries and National Parks in which the interests of wildlife would be safeguarded and given precedence over commercial and other conflicting forms of land use. Adequate forestry funds were earmarked for the proper development and scientific management of such wildlife refuges under the various five year plan schemes aimed at the welfare of wildlife

and building up an infrastructure for encouraging wildlife tourism. Thus, during the period from 1965 up-to-date, the following wildlife sanctuaries and national parks have been constituted in Gujarat State:—

(1) Gir Lion Sanctuary cum National Park in Junagarh Dist.

Area- 1412.12 Sq. Km. (including a core area of 258.71 Sq. Km. declared as a national park).

In due course of time, the entire sanctuary is expected to be upgraded into a national park.

(2) Velavadar Blackbuck National Park in Bhavanagar Dist.

Area— 17.83 Sq. Km.

(3) Bansda National Park in Valsad District.

Area— 6.08 Sq. Km. (to be shortly enlarged).

(4) Wild Ass Sanctuary in the Little Runn of Kutch.

Area—4953.70 Sq. Km.

(5) Nal Sarovar Bird Sanctuary near Ahmedabad.

Area— 115 Sq. Km.

(6) Jessore Sloth Bear Sanctuary in Banaskantha District.

Area— 180.66 Sq. Km.

In addition to the above, the following proposed sanctuaries and national parks are under active consideration:—

(1) Marine National Park off the Coast of Jamnagar.

(2) Baroda Lion Sanctuary near Porbandar (alternative home for the Asiatic Lion).

(3) Narayan Sarovar Chinkara Sanctuary in Kutch District.

(4) Flamingo Sanctuary in the Runn of Kutch.

(5) Piplod Sloth Bear Sanctuary in Bharuch District.

(6) Nature Education Sanctuary at Hingolghadh in Rajkot District.

(7) Sunderpura Blackbuck Preserve near Vadodara.

(8) Timbi Bird Sanctuary near Vadodara.

(b) The second important step was to set up a separate Wildlife Wing within the Forest Department in 1970. Initially, this Wing was headed by a Conservator of Forests with headquarters at Junagadh who was also designated as the State Chief Wildlife Warden. In 1977, however, these functions were entrusted to an Addl. Chief Conservator of Forests

with headquarters at Vadodara. This was the first time that such a high level post had been created by any State exclusively for wildlife work. It is now contemplated to create separate cadres of Wildlife Rangers, Wildlife Supervisors and Wildlife Watchers and to make direct recruitments to these posts from the open market by giving special preference to those living in forest areas and having particular interest in or aptitude for working in the wildlife wing. Special training courses in wildlife management are also being arranged at the Gujrat Forest Rangers' College at Rajpipla which has started functioning from April, 1979.

(c) Wildlife protection in this State has been strengthened with the adoption and promulgation of the Wild Life (Protection) Act, 1172, with effect from 1.2.73. Rules which were framed under this Act in 1974 are currently under revision.

(d) But by far the best barometer indicative of the State Government's enlightened attitude towards the vital problem of wildlife conservation is the progressive increase in the financial outlay on wildlife development schemes under its successive five year plans, as enumerated below:—

I Five Year Plan
(1951—1955).

— Nil.

II Five Year Plan
(1956—1960).

— Rs 9.36 lakhs.

III Five Year Plan
(1961-62 to 1965-66).
Three Annual Plans
(1966-67 to 1968-69).

— Rs. 6.38 lakhs

— Rs. 8.55 lakhs.

IV Five Year Plan
(1969-70 to 1973-74)

— Rs. 42.07 lakhs.

V Five Year Plan
(1974-75 to 1977-78).

— Rs. 78.14 lakhs.

1978-79.

— Rs. 30.82 lakhs

1979-80.

— Rs. 67.98 lakhs

Remaining 3 years of

— Rs. 307.20 lakhs

VI Five Year Plan.

Total Rs.
406 lakhs.

The following wild life projects which are currently under implementation will give some idea of the silent revolution which is being ushered in this State in the field of wild-life conservation:—

(1) Scheme for Nature Conservancy and Protection of Wildlife.

This general scheme embraces the development of the Gir Lion Sanctuary cum National Park, Velavadar Blackbuck National Park, Wild Ass Sanctuary, Nal Sarovar Bird Sanctuary, and Crocodile Breeding in Gir.

- (2) Establishment of a Second Home for Gir Lions in Barda forest near Porbandar.
- (3) Establishment of a Natural Lion Safari Park in Devalia Block of Gir Sanctuary.
- (4) Reintroduction of Blackbuck into Eastern Gir.
- (5) Establishment of a Natural History Museum Complex at the State Capital, Gandhinagar.
- (6) Establishment of Bansda National Park.
- (7) Establishment of Jessore Sloth Bear Sanctuary in Banaskantha District.
- (8) Establishment of a Nature Education Sanctuary at Hingolghadh in Rajkot District.
- (9) Reintroduction of the Grey Hornbill into Gir National Park.
- (10) Ringing of Flamingoes in the Runn of Kutch.
- (11) Erection of Road side Display Modules along the Ahmedabad-Gandhinagar Highway.
- (12) Maintenance of Sakkarbagh Zoo at Junagadh.

Other projects under active consideration are as under:—

- (1) Reintroduction of Hunting Cheetas from Kenya into the Saurashtra region of Gujarat.
- (2) Setting up a Breeding Farm for Grey Jungle Fowl and Hares in Dangs District for the benefit of the tribals.
- (3) Erection of Tree Top Cabins for viewing wild life.
- (4) Introduction of Wildlife Management training courses in the Gujarat Forest Rangers College at Rajpipla.
- (5) Laying out Nature trails in selected forest areas.

CENSUSES OF WILDLIFE POPULATIONS IN GUJARAT

Censuses of the major wild life species are carried out in this State at regular intervals as this data is indispensable for Scientific wildlife management. The results of recent censuses are given below:—

(i) Census in Gir (including Girnar)

	1974	1979	Remarks
Lion	— 180 (53 males + 77 females + 50 cubs).	205 (65 males + 82 females + 58 cubs).	By direct visual count on offered baits.
Panther	—	161	By direct round the clock observation on all water holes.
Hyaena	—	84	
Cheetal	4517	8431	
Sambar	706	760	
Bluebull	1528	2036	
Wild boar	1922	2365	
Chousingha	979	1042	
Chinkara	195	330	
Monkey	3938	6895	

(ii) Census of Tigers in Gujarat State: (indirect count from pugmarks).

1972	1979
8 tigers (all in Dangs District).	7 tigers (6 in Dangs Dist. + 1 in Rajpipla, Dist. Bharuch).

(iii) Census of Wild Asses in the Little Runn of Kutch (1976) P

Wild Asses	—	720	By direct visual count during ground survey.
Chinkara	—	191	
Bluebull	—	96	
Wolf.	—	61	
Black Buck	—	9	
Others (including Wild boar, hyaena, fox, etc).	—	114	

(iv) Census of Blackbuck in Velavadar National Park (1977)

Total black buck populations (by direct visual count by observations on foot.)	—	1676 (including 369 males + 1124 females + 183 fawns).
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THE GIR LION SANCTUARY PROJECT

Realising its grave responsibility in the matter of preserving the last remnants of the Asiatic race of lions struggling for survival in the Gir Sanctuary, the Government of Gujarat have launched the prestigious Gir Lion Sanctuary Project in 1972 at a total cost of over Rs. 45 lakhs. A one metre high rubble wall has been erected all round the periphery of the Sanctuary over a total length of around 400 Km. to keep off all outside cattle which were seriously competing for fodder with the wild ungulates in the Sanctuary and causing serious ecological degradation of the wildlife habitat. Side by side, this project has also provided for rehabilitation of the local maldharies (nomadic professional graziers) in newly created settlements outside the Sanctuary by stages with financial assistance from the Government of India. This project has achieved spectacular success and has been widely acclaimed both in this country and abroad. Consequently, the Gir Sanctuary was awarded the Indian Board of Wild Life Chairman's first Challenge Trophy as the best managed Wildlife Sanctuary in the country for the year 1976. The success of this project is clearly reflected in the 1974 and 1979 census figures of lions and other wildlife in Gir which have been given earlier and proves beyond a shadow of doubt that the Asiatic Lion is no longer in any danger of extinction. As an added precaution against the eventuality of an epidemic or other natural calamity, it has now been decided to establish an alternative home for the Asiatic Lion in the Barda forest of about 180 Sq. Km. near Porbandar.

OTHER ACTIVITIES

The Wildlife Wing of the State Forest Department maintains close liaison with other conservation organizations such as Indian Board for Wildlife, UNESCO, Bombay Natural History Society, World Wildlife Fund—India, Wildlife Preservation Society of India (Dehra Dun), Wildlife Preservation Society of Bhavnagar, Indian Society of Naturalists (Vadodara), etc. Co-operation of recognized conservationists and sportsmen in the protection of wildlife is enlisted through their appointment as Honorary Wildlife Wardens on district-wise basis and delegating to them necessary powers under the Wildlife (Protection) Act, 1972.

Interest in nature conservation in the younger generation and the general public is created by organizing talks, competitions, film and slide shows, exhibitions, etc. with the help of the Publicity Wing of the State Forest Department. The press is also kept informed about the activities and achievements in the field of wildlife conservation.

CONCLUSION

It will thus be abundantly clear that wildlife in this State which was once in a precarious plight has definitely turned the corner and is now assured of a bright and promising future, thanks to the enlightened policy and financial backing of the State Government. If the present favourable trend continues, the day is not far when we shall achieve a breakthrough in this important field in the same spectacular manner as already achieved in our pioneering venture of social forestry.

Fauna of Corbett National Park

(Continued from Cheetal, Vol. XXI, No. 1, September 1979)

By B.S. LAMBA AND R.K. BHATNAGAR

- ORDER : Channiformes (Murels or Snake headed fishes)
FAMILY : Channidae
28. *Channa orientalis* (Bloch and Schneider) Shoyan
ORDER : Mastacembeliformes (Freshwater eels)
FAMILY : Mastacembelidae
29. *Mastacembelus armatus* (Lacapede) (Bayan)

II. INVERTEBRATES

6. INSECTS

a. EPHEMEROPTERA (May flies)

By M. PRASAD

- Order : Ephemeroptera
Family : Polymitarcidae

1. *Polymitarcys indicus* Pictet

Family : Baetidae

2. *Baetis longistylis* Kaul & Dubey
3. *B. solitarius* Gillies
4. *B. himalayana* Kapur and Kripalani

Family : Ecdyonuridae

5. *Epeorus lahaulensis* Kapur and Kripalani

Family : Palingeniidae

6. *Palingenia orientalis* Chopra

b. ODONATA (Dragon flies and Damsel flies)

By ASKET SINGH and M. PRASAD

- Suborder : Zygoptera
Superfamily : Coenagrionidea
Family : Protoneuridae
Subfamily : Caconeurinae

1. *Caconeura autumnalis* Fraser

- Family : Platynemididae
Subfamily : Platyneminae

2. *Copera marginipes* (Rambur)

- Family : Coenagriidae
Subfamily : Pseudagriinae
3. *Pseudagrion rubriceps* Selys
Subfamily : Ischnurinae
4. *Ischnura forcipata* Morton
5. *Ischnura delicata* (Hagen)
Subfamily : Agriocneminae
6. *Agriocnemis pygmaea* (Rambur)
Family : Chlorocyphidae
7. *Rhinocypha quadrimaculata* Selys
Family : Agriidae
Subfamily : Agriinae
8. *Neurobasis chinensis chinensis* (Linn.)
Superfamily: Libelluloidea
Family : Libellulidae
Subfamily : Libellulinae
9. *Orthetrum taeniolatum* (Schneider)
10. *Orthetrum glaucum* (Brauer)
11. *Orthetrum pruinatum neglectum* (Rambur)
Subfamily : Diasatopodinae
12. *Palpopleura s. sexmaculata* (Fabr.)
Subfamily : Sympetrinae
13. *Crocothemis s. servillia* (Drury)
Subfamily : Tritheminae
14. *Trithemis aurora* (Burm.)
15. *Trithemis festiva* (Rambur)
Subfamily : Pantaliinae
16. *Pantala flavescens* (Fabricius)
- C (i) Order : Orthoptera (Short-horned Grasshoppers)
By ASKET SINGH
Family : Acrididae
1. *Chrotogonus trachypterus trachypterus* (Blanchard)
2. *Aularches miliaris* (Linnaeus)
3. *Atractomorpha crenulata crenulata* (Fabr.)
4. *Oedaleus senegalensis* (Krauss)
5. *Oedaleus abrustus* (Thunberg)

6. *Acrotylus humbertianus* Saussure
7. *Trilophidia annulata* (Thunberg)
8. *Aiolopus affinis* (Bolivar)
9. *Phloeoba infumata* Brunner
10. *Acrida exaltata* (Walker)
11. *Aswatthamanus cylindricus* Kirby
12. *Pusana rugulosa* (Uvarov)
13. *Sphingonotus longipennis* Saussure
14. *Sikkimiana darjeelingensis* (Bolivar)
15. *Paraconoyma scabra* (Walker)
16. *Oxya hyla* Serville
17. *Oxya velox* (Fabr.)
18. *Pacyacris vinosa* (Walker)
19. *Patanga japonica* (Bolivar)
20. *Catantops innotabilis* (Walker)
21. *Stenocatantops spendens* (Thunberg)
22. *Chondracris rosea* (De Geer)
23. *Eyprepocnemis alacris* (Serville)
24. *Tylotropidius varicornis* (Walker)
25. *Oxyrrhepes obtusa* De Haan
26. *Hieroglyphus concolor* (Walker)
27. *Choroedocus capensis* Thunberg
28. *Spathosternum prasiniferum* (Walker)

C (ii) Order : Orthoytera (Hoppers and Crickets)

By R.N. BHARGAVA

Family : Gryllotalpidae

1. *Gryllotalpa fossor* Scudder
- Family : Gryllidae
2. *Gryllus domesticus* Linn.
3. *Gymnogryllus erythrocephalus* (Serville)
4. *Homoeogryllus taicoun* Saussure
5. *Pteronemobius fascipes* Walker

Family : Eneopteridae

6. *Madasumma ventralis* Walker

d. TERMITES (INSECTA : ISOPTERA)

By S.C. VERMA

Family : Kalotermitidae

1. *Neotermes bosei* (Snyder)

Family : Rhinotermitidae

2. *Heterotermes indicola* (Wasmann)
3. *Coptotermes heimi* (Wasmann)

Family : Termitidae

4. *Speculitermes cyclops cyclops* Wasmann
5. *Speculitermes triangularis* Roonwal & Sen-Sarma
6. *Microcerotermes championi* Snyder
7. *Microcerotermes beesoui* Snyder
8. *Angulitermes akhoriasinensis* Chatterjee and Thakur
9. *Odontotermes bhagwatii* Chatterjee & Thakur
10. *Odontotermes distans* Holm. & Holm.
11. *Odontotermes feae* (Wasmann)
12. *Odontotermes giriensis* Roonwal & Chhotani.
13. *Odontotermes gurdaspurensis* Holm. & Holm.
14. *Odontotermes horai* Roonwal & Chhotani
15. *Odontotermes lokanandi* Chatterjee & Thakur
16. *Odontotermes microdentatus* Roonwal & Sen-Sarma
17. *Odontotermes obesus* (Rambur)
18. *Odontotermes parvidens* Holm. & Holm.
19. *Odontotermes redemanni* (Wasmann)
20. *Microtermes mycophagus* (Desneux)
21. *Microtermes obesi* Holmgren.
22. *Microtermes unicolor* Snyder.

e. HEMIPTERA (Bugs)

By M. PRASAD

Order : Hemiptera

Family : Hydrometridae

1. *Ptilomera laticaudata* Hardw.

Family : Nepidae

2. *Ranatra filiformis* (Fabr.)
3. *Ranatra elongata* (Fabr.)
4. *Laccotrephes ruber* (Linn.)

Family : Naucoridae

5. *Heleocoris ovatus* Montandon.

Family : Coreidae

6. *Anoplocnemis phasiana* Fabr.
7. *Serinetha augur* Fabr.

Family : Reduviidae

8. *Acanthaspis flayipes* Stal.
9. *Ectrychotes dispar* Reuter.

Family : Pentatomidae

10. *Macroscytus brunneus* Fabr.
11. *Garpocoris pmlidus* Dallas.
12. *Dalpada affinis* Dallas
13. *Dalpada versicolor* Herrich-Schaffer
14. *Dolycori indicus* Stal.
15. *Plautia fimbriata* Fabr.
16. *Cydnus indicus* Westw.
17. *Melanitis leda* (Linnaeus)
18. *Melanitis zitenids* (Herbst)
19. *Elymnias hypermnestra* (Linn.)

f. Order Coleoptera (Beetles)

By R.N. BHARGAVA

Family : Staphylinidae

1. *Megarthus septempunctatus* Champ.
2. *Phyllodrepa (Dropephylla) almoresis* Champ.
3. *Phloenomis (Phlosostiba) pincola* Champ.
4. *Phyllorhinum florivagum* Champ.
5. *Tregophloeus (Boopinus) indicus* Kr.
6. *Stenus kratzi* Bernh.
7. *Dianous distigma* Champ.
8. *Philonthus aeneipennis* Boh.
9. *Creophilus maxillosus* L.
10. *Bolitobius spinipes* Champ.

Mr. S.R. Chaudhury's Letter

I have gone through the note of Mr. Raza H. Tehsin.

As I had stated during my talk on Khairi, the cats use the fold on the outer edge of each pinna to feel the direction of wind, its gentlest movement, and orient their stalking, approach to put off their smell from the quarry.

Whiskers and other vibrassae are used mainly to minimise sound in moving through gaps.

The soft hairs in front of the aforesaid fold on the ear can feel the slightest movement of the air which the tough and rigid vibrassae may not.

The twitching of the whiskers by the panther observed by Mr. Tehsin may be a 'displacement activity' to let out some of the tension in stalking.

S.R. Choudhury

(For reference see Page 35)

Great Indian Bustard

Godawan or the great Indian Bustard (*Choriotis nigriceps* Vigors) is the rarest bird of India. It is half the size of saras crane with strong bare legs equipped with strong running (cursorial) feet. It walks with confidence and grace.

Due to its weight it takes to wings only as a last resort to escape. The take off is heavy and is air borne to a low height and glides down with the first opportunity. The bird is not brightly coloured but the pattern of brown, black dots on white plumage make interesting designs. The body is buff above with fine black vermiculations; white below with brown black gorget on lower breast. The distinct black crest on head adds to its beauty. In colouration male and female are similar but the female is smaller. The male may be 8 to 14 kg in weight while female is just half of it.

The bustard is a bird of open scrubby grasslands especially semi-arid conditions. But it is equally at home in the Thar grassy in flat green plains and flat rocky outcrops called 'magra lands'. The vegetation of the habitat is dominated by grass (*Lasiurus scindicus*) & bushes of *Leptadenia*, *Crotolaria*, *Aerua* and *Capparis*. The bird rests during day under *Capparis* bushes and feeds during cool hours of morning and afternoon. Its food consists of tender shoots and fruits of plants but largely depends on beetles including blister beetle, Lizards, eggs and locust are relished by the bird.

The bustard lives in pairs or in trees when with its chick. It is polygamous species and each cock courts about 3-5 hens. Nuptial display of strutting and posturing before females with gular pouch inflated to grotesque proportions looking like a wobbling feathered bag is conspicuous. The expanded tail is fully raised between the dropping wings and touch the nape of the backward arched neck. It is often accompanied by a deep booming moan loud enough to be heard over 300 metres. This bellow lends the bird the name 'Hukna'. Only one egg (dark or pale brown in colour) is laid in late summers on scrapped ground in shelter of a bush. Unfortunately not much is known about the breeding biology of the bird.

The Great Indian Bustard was a common bird a century ago. It was found throughout open lands of penninsular India. A decade ago its number dwindled to about 1260 (Dharamkumar Singhji 1968). Conditions of its habitat have further deteriorated by extended agriculture and ruthless modern hunters. There are now less than a thousand birds mostly confined to Rajasthan, parts of Gujarat and Maharashtra. But the last hold and hope for the bird appears to be only Rajasthan, specially the Closed Area of Sonkhlia (Ajmer) where 10-12 birds can be seen any time and the Desert National Park which promises preservation and protection of the habitat and the bird to the posterity.

पक्षियों का अन्तर्राष्ट्रीय मिलन स्थल, भरतपुर

वीरेन्द्र सहाय सक्सेना

भारतीय वन सेवा, जयपुर

सत्रहवीं शताब्दी के अन्त में पराक्रमी जाट रस्तम द्वारा निर्मित भरतपुर नगर, जिसे सन् १६३३ में शूरवीर महाराजा सूरजमल ने अपनी राजधानी बनाया, उसी जाटों की शौर्य गाथाओं से परिपूर्ण लोहागढ़ के दक्षिणी आंचल से सटा केवलादेवधना अथवा भरतपुर पक्षी विहार अब पक्षियों के अन्तर्राष्ट्रीय समागम केन्द्र के रूप में समस्त विश्व में विख्यात हो चुका है। सच पूछो तो, तनाव पूर्ण वातावरण से एकदम अलग इन्हीं पक्षियों की गीतों भरी बस्ती का आनन्द लेने अध्ययन करने तथा प्रेरणा लेने भरतपुर में नाना देशों के पक्षी विशेषज्ञ वैज्ञानिक, चित्रकार, नागरिक व पर्यटक शीतकाल के आगमन के साथ ही आने लगते हैं। मानव मात्र तो कदाचित् अपने राज्यों तथा राष्ट्रों की संकुचित भौगोलिक सीमाओं के दायरे में ही बंधा रहेगा पर यह परिन्दे सैकड़ों कोसों से यहाँ आकर संसार को एकात्मकता का अनुकरणीय उदाहरण प्रस्तुत कर रहे हैं।

प्रकृति का अनुपम स्थल

२६ वर्ग किलोमीटर में फैला यह विहंगारण्य यहाँ के भूतपूर्व शास्त्रकों की सूझबूझ से सुन्दर एवं अनोखा स्थल बन चुका है। जगती के आश्चर्यों में से एक आगरा का ताजमहल, चूने पत्थर से बना मानव कला का प्रतीक है, उसी के लगभग ५० किलोमीटर पश्चिम में स्थित यह पक्षी विहार हरीतिमा के चादर से ढका जलमग्न वृक्षावलियों की एक नैसर्गिक सृजनात्मक रचना है। इसकी पाँच वर्ग किलोमीटर की बनी प्राकृतिक छिछली झील के जल का स्रोत, वर्षा के पानी के अतिरिक्त, बाणगंगा तथा गम्भीरी सरिताओं के जल को बाँधने वाले अज्ञान बंध से प्रतिवर्ष छोड़ा जाने वाला नीर है। मुगल संस्कृति के अवशेषों से समृद्ध फतेहपुर सीकरी यहाँ से आठ घंटे की यात्रा की दूरी पर ही है। आदि मानव की कर्मभूमि बंध-बारेठा की गुफायें भी यहाँ से २० किलोमीटर से दूर नहीं हैं। यहाँ शान्तिदायी प्रकृति बिखरी पड़ी है। कितना अनोखा कितना अद्वितीय है यहाँ का पर्यावरण। कीकर, कलम, बेर, शमी (खेजड़ी), वरणा तथा पीलू वृक्षों से आच्छादित यहाँ की सुरम्य भूमि, सैकड़ों चेतल, नीलगाय, वाराह, कृष्णमृग, जरख, सेही सियार, वनबिलाव, चीताबिल्ली, मछेरीबिल्ली, बिज्जु, ऊदबिलाव, नकुल, शशांक, छछून्दर आदि को आश्रय देती है। दुर्लभ चींटीभक्षक सेलू सांप तथा भूँछू भी यहाँ दीख जाते हैं। दलदली भूमि में खसघास यहाँ उगती है जिससे देश का सर्वोत्तम खस इत्र प्राप्त किया जाता है। जल वनस्पति में, नाड़ी, कुमुदनी, ऐंच, कौदों, बगस्थान, मोथा आदि अनेकों जल पक्षी तथा सारस, सफेद सारस, सारंग, लोहसारंग, राजहंस, कलहंस, लालसिर, बतख, बेखुर, पीतसन, सीखपर, गुगराल, नकटा, सुर्खाव, आदि को भोजन देती है। वहीं पानी में प्रचुर मात्रा में उपलब्ध मछलियाँ, जंघीला, घोंघिला, बुगले, चमचे, जलकौवे, हवासिल, आड़, पनडुब्बी, धुमरा, किलकिला, अंजन, मछलीमार, कुरारी आदि पक्षियों को आकर्षित करती हैं। एक पक्षी विशेषज्ञ के अनुसार यहाँ पर जंघीला (पेंटेड स्टॉक) एक ही दिन में

४००० से ६००० किलोग्राम मछली खा लेते हैं। सैकड़ों प्रकार के अनगिनत कीड़े मकोड़े, पतंगे, घोंघे, सीप, चींटी, दीमक, मेंढक, बिच्छु, सांप, छिपकली, प्रमृति, लहटोरा, महालाट, भूजंगा, टीसा, लगर, बुलबुल, पतरिंगा, बबूनी, हुदहुद आदि पक्षियों का उदर पुति कर 'जीवो जीवस्य जीवनम्' की उक्ति चरितार्थ करते हैं। प्रकृति के इस विशाल भण्डार का सभी लाभ उठा सकें, इस दृष्टि से ४० किलोमीटर से भी अधिक सड़कों पर कार जा सकती है। वन्य जीवों का गहन अध्ययन करने वालों के लिये वृक्ष से ढंकी पगडंडियाँ बनी हुई हैं, जो छोटे-छोटे बन्धों का भी काम करती हैं। सारी ही पक्षी-विहार स्थली कई भागों में पशु पक्षियों के नामों के लेकर विभक्त की गई है यथा कौंचसागर, नीलताल, मृगताल, चीतलवन, मारीच्यवन, वाराहवन, मान सरोवर, हंस सरोवर, बकालय, चकवा-चकवी, पाइथनपोइन्ट। बंध इस प्रकार निर्मित किये गये हैं। कि पानी की गहराई १.५ मीटर से ज्यादा न हो सके। स्थानस्थान पर पशु पक्षियों की लीलाएँ देखने हेतु 'वाच टावर' बनाये गये हैं। जलविहार निमित्त नौकायें हैं और पक्षी-विहार में ही ठहरने हेतु 'शान्ति कुटीर' तथा 'फोरेस्ट लोज' विश्राम गृह बने हुये हैं।

मुर्गाबी आखेट

भरतपुर के तत्कालीन महाराजा अपने आमन्त्रित अतिथियों के साथ, शीतकाल में जब प्रवासी मुर्गाबियों का यहाँ बाहुल्य होता था, अनेक आखेट अभियानों का आयोजन करते थे। इस पक्षी विहार में मान सरोवर (केवलादेव डिग्गी) पर लगे एक शिलालेख में १९०२ से १९६४ तक के शिकार का विवरण लिखा हुआ है। राजसी आखेटों में सर्वाधिक बतखें ४२७३, १२ नवम्बर १९३० को, एक ही दिन में तत्कालीन वायसराय लार्ड लिनलिथगो सहित ३९ बन्दूकधारियों द्वारा मौत के घाट उतारी गई। शिलालेख के अनुसार ५५६ (सबसे कम) मुर्गाबियाँ २३ फरवरी १९६४ को ५१ बन्दूकधारियों ने मारी इसके उपरान्त बड़े शिकार कम ही हुये और उनका लेख भी शिला पर नहीं है।

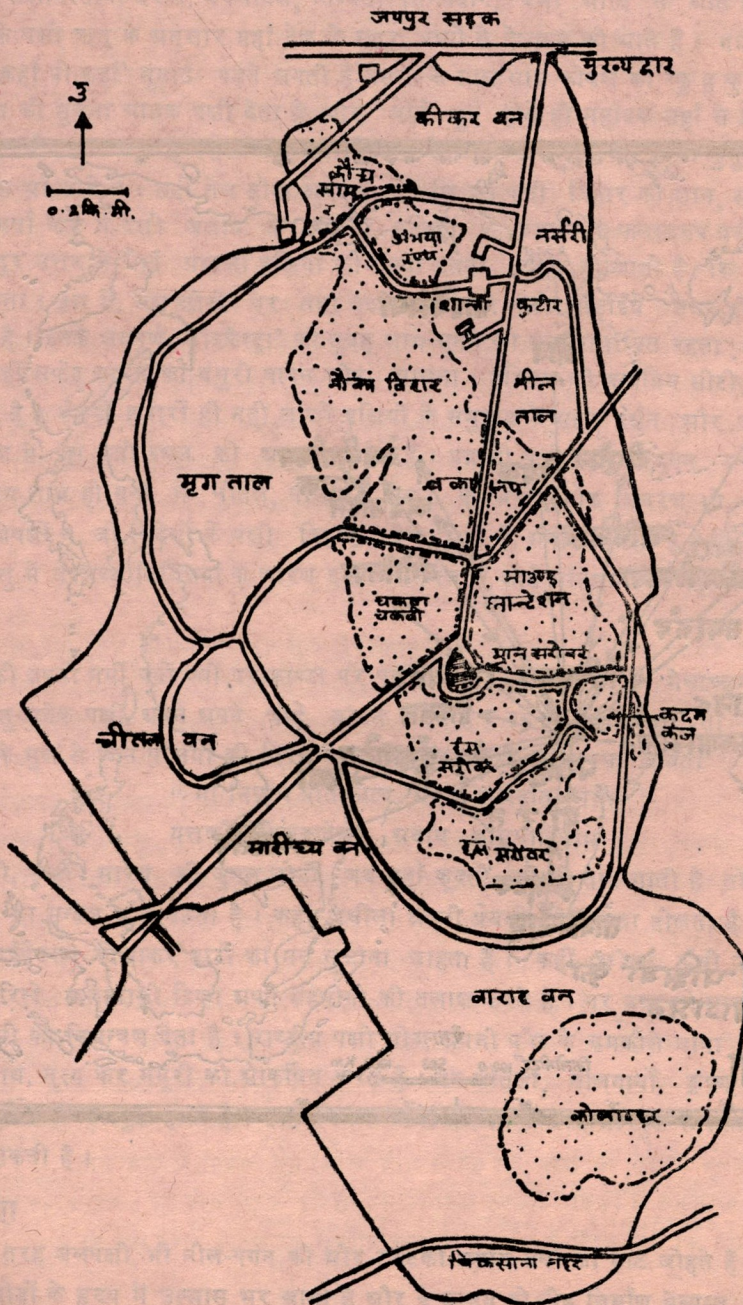
आखेट निषिद्ध

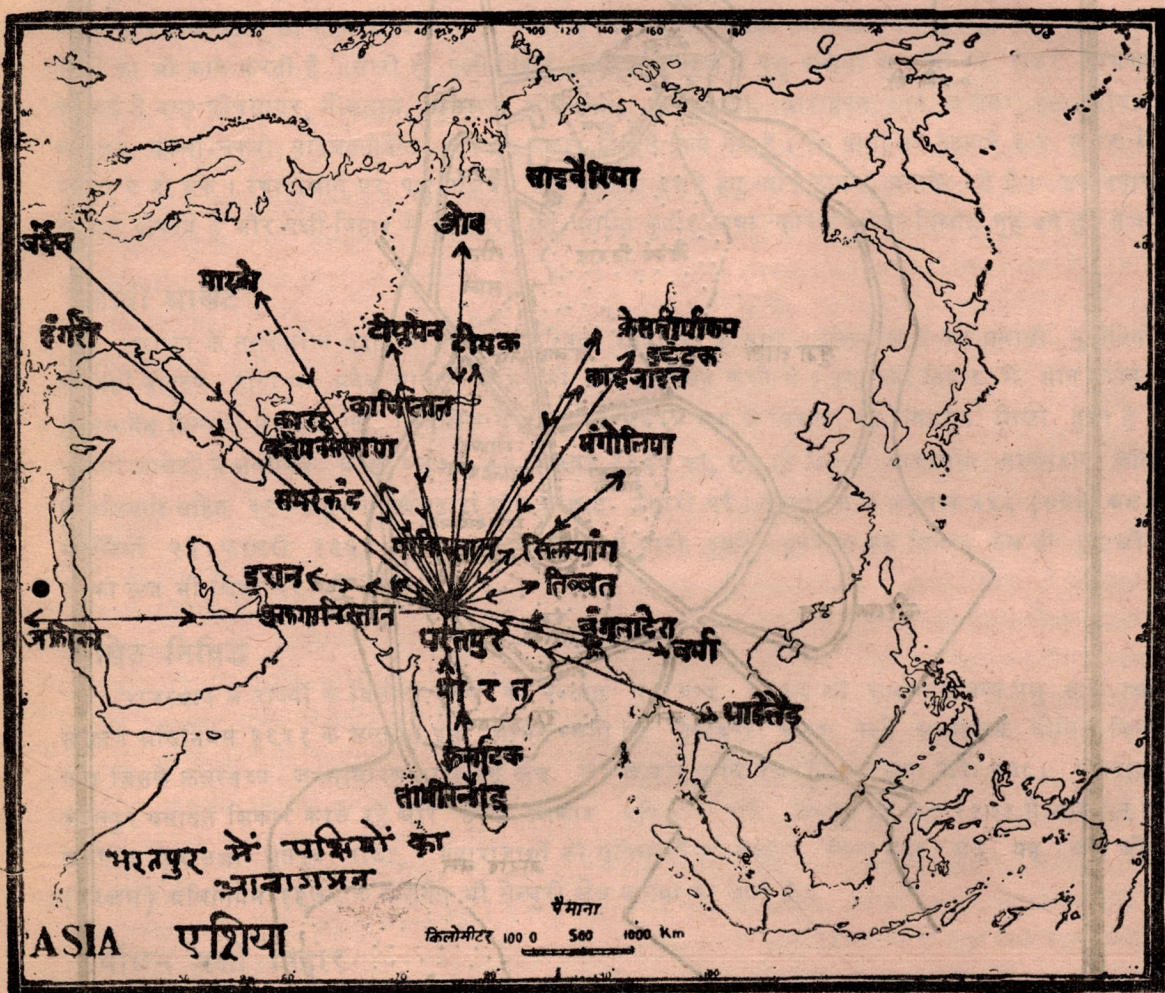
राजस्थान में राज्यों के विलीनीकरण के पश्चात् १३ मार्च १९५६ को राजस्थान वन्य पशु एवं पक्षी संरक्षण अधिनियम १९५१ के अन्तर्गत इस आखेट स्थली को सेन्चुरी अथवा पक्षी अभ्यारण्य घोषित किया गया जिसके फलस्वरूप जनसाधारण द्वारा इस क्षेत्र में शिकार करने पर प्रतिबन्ध लगा दिया गया। महाराजा भरतपुर यथावत शिकार करते रहे और उनके शिकार अधिकार तभी समाप्त हुये जब १९७१ में संविधान में संशोधन कर सभी भूतपूर्व राजा, महाराजाओं की सुविधाओं को समाप्त किया गया। अब यह वन्य जीव (संरक्षण) अधिनियम १९७२ के अन्तर्गत भी सेन्चुरी क्षेत्र बनाया जा चुका है।

सर्वोत्तम पक्षी विहार

भारत में '१२५० प्रकार के पक्षी पाये जाते हैं। केवलादेव थाना के इस सीमित क्षेत्र में ही ३२२ प्रकार के पक्षियों की सूची तो लेखक द्वारा १९७५ में छापी जा चुकी है। अभी ६ प्रकार के पक्षी और दृष्टिगोचर हुये हैं। इनमें से १०३ प्रकार की चिड़ियाँ तो घने में ही प्रजनन करती रहती हैं। इनमें ११० प्रकार के पक्षी विदेशों से यथा रूस, साईबेरिया, मंगोलिया, काज़िकस्तान, थाईलैण्ड, हंगरी, जर्मनी, अफ्रिका, पाकिस्तान,

भरतपुर पक्षी विहार





बलूचिस्तान, अफगानिस्तान, ईरान, बंगलादेश, तिब्बत, सिनक्यांग, बर्मा आदि से आते हैं। शेष १०० से भी अधिक प्रकार के पक्षी ऋतु के अनुसार यहाँ देश के सुदूर भागों से देशाटन को आते हैं। गर्मी शुरू होते ही यहाँ पपीहा की 'पी कहीं पी कहीं' सुनाई पड़ने लगती है बसन्त के साथ साथ कोयल की 'कु हू कु हू' गूँजने लगती है। वर्षा के आगमन की सूचना चातक पक्षी देता है और वर्षा शुरू होते ही महाबक यहाँ से प्रस्थान कर देते हैं। ऐंठा घास का बीज पक गया है उसका अनुमान सीखपर के आगमन से लग जाता है। कुमुदनी के फल के दाने पकते ही कलहंस आ जाते हैं। सर्दी तेज होना शुरू हुई नहीं कि इस पक्षी विहार की शान, सफेद सारसों की टोली आ जाती है। वर्षा ऋतु में देशी जलीय व स्थलीय पक्षियों के प्रजनन के फलस्वरूप बड़ी पक्षी संख्या तथा शीतकाल में सुदूर उत्तर से आई प्रवाजी पक्षियों की संख्या इतनी अधिक हो जाती है कि बिना देखे विश्वास ही नहीं हो सकता। जल में, जल छोरों पर तथा वृक्षों पर जिधर नजर दौड़ाये उधर ही इन पक्षियों की छटा मन मोह लेती है। इनके लयपूर्ण 'ग्रौरकैस्ट्रा' को सुबह शाम सुनने को मन लालायित रहता है। कहीं सारस का प्रणयगान तो कहीं सफेद सारस का बंसुरी वादन और नाचना। हरियल की कर्णप्रिय सीटी किसी का भी ध्यान खींचने में समर्थ है। सैकड़ों हजारों ही नहीं लाखों पक्षियों के समुदाय के सहज दर्शन और वह भी निर्भय और स्वच्छन्द परिवेश में, इस पक्षी स्थल को अनुपमता देते हैं। प्रवाजी पक्षी तथा प्रजनन करते देशी पक्षियों का जमघट तथा साथ साथ ही वनों में चीतल, नीलगाय, सूअर के बेरोक-टोक विचरण से इस पक्षी विहार को अनेक पक्षी विशेषज्ञों ने, जो विदेशों के पक्षी विहार देख आये हैं, सर्वोत्तम कहा है। निश्चय ही इस अभ्यारण्य की यहाँ हर ऋतु में उपलब्ध विविधता के कारण इस विश्लेषण में कोई अतिशयोक्ति नहीं दीखती।

प्रेम लीला

निदाघ की तपती गर्मी ज्यों ज्यों पराकाष्ठा पर पहुँचती है और आकाश में मेघाच्छन्न होने लगता है, त्यों त्यों वंश वृद्धि हेतु अनेक पक्षी अपने अपने जोड़े बांधने लगते हैं। उनकी प्रेम लीला तो देखते ही बनती है। बाल्मिकि मुनि के मुख से जिन पक्षियों की विरह वेदना देखकर संस्कृत की प्रथम, कविता

“ माँ निषाध प्रतिष्ठात्व अगमः शाश्वति समाः

यत्तक्रौंच मिथुनादेकम अवधि काममोहिताम् ।

की रचना हुई थी, उन्हीं सारस की जुगल जोड़ी जब यहाँ कूदती नाचती तथा गाती है तो सम्पूर्ण वातावरण में निश्छल प्रेम का सन्देश गूँज उठता है। कहीं, जंधीला अपनी प्रेयसी को मनाता दीखता है तो कहीं बगुला अपने राजसी पर (आईग्रेटस) दिखाकर नारी का मन लुभाना चाहता है। कहीं अंजन ऊँची उड़ान भरने लगते हैं तो कहीं अन्य परिन्दे कलाबाजी दिखा अपने सहयोगी की तलाश करते हैं। नर बया तो सुन्दर से सुन्दर नीड़ बुन अपनी भावी पत्नी को निमन्त्रण देता है। राष्ट्रीय पक्षी मोर, अपनी पूँछ के चमकीले नाना रंग दिखा, अंग अंग में थिरकन के साथ, नृत्य कर मयूरी को आकर्षित करते हैं। नर चीतलों, नीलगायों, कृष्ण मृगों, सांभरों में भी जोड़े बनाने के पूर्व घमासान युद्ध होता है। इस परिश्रम तथा प्रतीक्षा के बाद जो सुख मिलता है उसकी सहज ही कल्पना की जा सकती है।

नीड़ निर्माण

किसानों की तरह जलपक्षी भी नील-गगन की ओर टकटकी लगाये वर्षा की बाट जोहते हैं। वर्षा के आगमन के साथ साथ इन जोड़ों के हृदय में उल्लास भर जाता है और वे तन्मय हो नीड़ निर्माण में व्यस्त हो जाते हैं। जलपक्षी

बहुधा अपने घरोंदे, कांटेदार कीकर वृक्ष, जो चहुं ओर पानी से घिरा रहता है, उस पर ही बनाना पसन्द करते हैं, शायद चूजों की सांप, बिज्जु, बिल्ली आदि से सुरक्षा की दृष्टि से। नीड़ स्थान चयन करते समय यदा कदा इनमें बोल चाल हो जाती है पर एक बार एक जोड़े ने जब एक जगह छाँटा ली तो फिर दूसरा उस पर अतिक्रमण नहीं करता। पूरा ही वृक्ष एक बहुमंजलीय प्रसूतिगृह बन जाता है। एक ही पेड़ पर कई प्रकार के पक्षियों के १५० तक घोंसले देखे गये हैं। वृक्ष पर सबसे ऊपर बड़े पक्षी जैसे जंधीला, घोंधिला, बुज्जा, चमचा, पनडुब्बी, बीच में काबुद, अंजन, क्वाक, अंधा बगुला तथा नीचे जल कौवे, गायबगुले और करचिया-बगुले अपने घोंसले बनाते हैं। यहाँ पर तब भेद न तो बड़े छोटे का रहता है और न काले गोरे का। जात-पात की भी भावना यहाँ विलीन हो जाती है। एक ही तरु पर बड़ा जंधीला है तो छोटा बगुला भी जहाँ उस पर सफेद चमचा है तो काला कलूटा जलकौवा भी है। एक ही द्रुम पर नौ प्रजाति के पक्षियों के घोंसले यहाँ देखे गये हैं। ये सीधी-सादी दीखने वाली चिड़ियाएँ जब चील, बाज, उकाव, सांप, कौवे आदि के आक्रमण से अपने लाड़लों की रक्षा करती हैं तो दाँतोंतले अंगुली दबानी पड़ती है। कैसा सुन्दर है समुदाय साहचर्य और कैसा प्रशंसनीय है मातृप्रेम। इन दृश्यों के यहाँ सुलभ दर्शन के कारण ही कई पर्यटक इन भावनाओं को ग्रहण करते हैं, चाहे स्थाई रूप से ही। अन्य जलीय व स्थलीय पक्षी जमीनमें, जल वनस्पति पर, झाड़ियों में, पेड़ों के खोखलों व तनों में अपने घोंसले बनाते हैं। बया के आधा मीटर तक लम्बे भूलते हुये घोंसले तो अच्छे अच्छे बुनकरों को भी मात देते हैं।

प्रवाजी पक्षी

ज्यों ज्यों उत्तरी बर्फिले प्रदेशों में तापमान गिरने लगता है वहाँ पर बसे पक्षी अपने घर छोड़ने की विवश हो जाते हैं, चाहे वह तिब्बत हो या साइबेरिया। अधिकांश पहले भरतपुर आते हैं मानों यह उनका रेल्वे जंक्शन है। अध्ययन से पता चला है कि पर्यटक पक्षी जब पहले उतरते हैं तो काफी कमजोर होते हैं, आखिर हजारों मील की यात्रा की थकान व मेहनत जो होती है। इस पक्षी स्थली में दीवाली के बाद ११० प्रजाति के प्रवाजी (माईग्रेटरी) पक्षी आने लगते हैं जिनमें विदेशी डुबडुबी, गुलाबी तथा डालमेशियम हवासिल, कालाबगुला, कलहंस, राजहंस, चकवाचकवी, चेतवा, चेतो, सीखपर, नीलसिर, लालसिर, बुड़ार, अबलक, कुरचिया, तिड़ारी, बेखुर, बाज, शाहबाज, काला गिरगिटमार, मछलीमार, परदेशीबहरी, सारंग, कुरंज, फेद सारस, पीविट, जरिया, छोटाबट्टन, बड़ा बट्टन, बड़ा गुलिन्डा, खग, चुपका, चाहा, पनलहा, घाईवाला, घूमरा, छोटे कानवाला उल्लू, साईक चिपयक, लाल लहटोरा, तिलयेर, तुर्रा, फुन्दकिया, पानी का पिलकुआ, हुसेनीव मोतिया पिद्दा, खर पिद्दा, थिरथिरा, धोबिन, गन्दाम, आदि शामिल हैं। कई पक्षी तो ऐसे हैं जिनका अभी स्थानीय नामकरण ही नहीं हुआ है। सफेद सारस तो साइबेरिया की ओबनदी घाटी से सम्भवतया अफगानिस्तान होते हुये भारत में भरतपुर ही आते हैं 'बड़ा दिन' मनाने और बृज की होली का रस ले वापिस चले जाते हैं। ये सुन्दर श्वेत वर्णीय लाल चोंच वाले पक्षी, जब अपनी तान छोड़ते हैं तो लगता है मानो नटखट कान्हा अपने ग्वाल सखाओं के साथ बेंसी बजा रहा हो। सर्दी में, यहाँ ३०० प्रकार के पक्षी दूर दूर से आये लाखों की संख्या में पाये जाते हैं। मानो वो कोई 'रैली' अथवा विश्व सम्मेलन में किसी विशिष्ट समस्या पर गोष्ठी करने आये हों। यह कार्यशाला प्रतिवर्ष ही विचारों के आदान प्रदान को यहाँ होती है। अतः भरतपुर पक्षियों का संयुक्त राष्ट्र संघ ही है।

छल्ला-निशानी

पक्षियों का संसार भी अद्भुत संसार है। पक्षी विशेषज्ञ इस उलझन में पड़े हैं कि क्यों कर पक्षी नियमित रूप से परिवर्तन करते हैं। कैसे ये मार्ग ढूँढते हैं। पक्षी जगत की अनेक समस्याओं के अध्ययन के लिये जाने माने पक्षी विशेषज्ञ डाक्टर सालिम अली की देखरेख में भरतपुर से ही २५६ प्रजाति के लगभग ६७००० पक्षियों को बोम्बे नेचुरल हिस्ट्री सोसायटी ने पकड़ कर एल्युमीनियम के छल्ले पहनाये हैं जिनमें सैकड़ों पुनः पकड़े गये। इनसे बड़ी विस्मयकारी सूचनाएँ मिली हैं। एक चैती (कामन टील) जिसे भरतपुर में ६ फरवरी १९६६ को छल्ला पहनाया गया था, वह १६ मई १९६६ को ही ३५०० किलोमीटर दूर टोमस्क (रूस) में पकड़ी गई। इसी तरह एक घाईवाला (रफ एण्ड रीव) को १-१०-६७ को भरतपुर में छल्ला पहनाया गया, जो वसंत में उड़कर मई १९६८ में ५८५० किलोमीटर दूर याकुशियान (रूस) में पाया गया। इससे स्पष्ट है कि कई पक्षी तो एक ही साल में कम से कम १२००० किलोमीटर की यात्रा करते हैं। गुगराल (स्पोट बिल) जो सामान्यतया एक ही स्थान पर रहने का अभ्यस्त माना जाता है, वह भरतपुर से रूस तक पहुँचा पाया गया। इसी प्रकार एक ग्राड (कूट) जिस पर मास्को का छल्ला था वह भरतपुर में पहुँच गई। कलहंस, मंगोलिया में जाकर प्रजनन करते पाये गये हैं। तो राजहंस के, तिब्बत की पवित्र मानसरोवर झील के किनारे, अण्डे देखे गये हैं। इस अध्ययन से यह भी ज्ञात हुआ है कि भरतपुर से लौटते समय प्रवाजी मुर्गाबियों में औसतन ३५० ग्राम की वृद्धि हो जाती है। छपकेदार चुपका (स्पेटेड सेंड पाइपर) कम से कम १३५ दिन, तो यिरथिरा (ब्लेक रेड स्टार्ट) ९६ दिन घने में रहता है। यह भी मालुम हुआ है कि नर प्रवाजी पक्षी की अपेक्षा मादा पक्षी विहंगारण्य में अधिक ठहरी विशेष तौर पर सीखपरकी।

कुछ पक्षियों के छल्ले पहना कर मिली सूचना का विवरण निम्नप्रकार है:—

क्र.सं.	नाम पक्षी	छल्ला नम्बर	दिनांक छल्ला पहनाना	स्थान व दूरी पुनः पकड़ा जाना
१.	घाईवाला (रफ एण्ड रीव)	बी १८४८	११-१०-६५	८-६-६७ क्रेसनोयार्क्स (रूस) ४७०० कि० मी०
२.	चेतवा (गारगिनी टील)	सी ३८२	४-४-६२	१८-८-६२ चरनोविल (रूस) ५१०० कि० मी०
३.	चैती (कामन टील)	सी ४८८६	२१-१२-६७	२३-५-६८ लेन्सकी (रूस) ४६०० कि० मी०
४.	सीखपर (पिनटेल)	एफ १८७०	२६-१०-६७	२४-५-६८ याकुशियान ४६५० कि० मी०
५.	पीतसन (विजियन)	एफ २८४०	५-१२-६७	६-५-६८ इकुटस्क (रूस) ३८७५ कि० मी०
६.	तिड़ारी (शावलर)	एफ ४६४६	१६-२-६८	१०-३-६८ समरकंद (रूस)
७.	अबलक (टफटेड डक)	एफ ७६४१	६-११-६६	१५-२-७१ भांसी (उत्तर प्रदेश)
८.	ग्राड (कूट)	एफ १०३८१	२०-१-७०	१-११-७० काबुल
९.	सुखवि (ब्राह्मणीडक)	जी २४८४	२-१२-७०	१४-२-७१ मथुरा (उत्तर प्रदेश)
१०.	नकटा (कोम्बडक)	के ७२६	२८-११-७०	१४-२-७१ बहराइच (उत्तर प्रदेश)

निाहनी-१७७३

यों कैमरा साफ ०५६ कलमि में पिक्चिं सु दिखत साफ किंकि में समुदाय की है साफ साफ में हद में

संज्ञासूचक संख्या ८३-३-२१ ८३-४-४ ८३-६ डि (नर्सि किर्लोस्कर) १९८६-९

Review of Reviews

(Tiger ! The Story of The Indian Tiger)

TIGER! The story of the Indian tiger, has been described as an authoritative, reliable, and exhaustive with descriptions with memorable clarity, persuasive, fascinating, splendid, marvellous, excellent and absorbing book. For its illustrations, stunning, superb, excellent, gorgeous and unique are some of the superlatives used by the reviewers in the world opinion. David MacDonald of the Guardian, Bruce Campbell in Oxford Mail, Christopher Wordsworth of Observer, Jan Morris of the Times, Duff Hart Davis in Sunday Telegraph, R.N.T.W. Fienner in New Scientist, the literary legend, Nirad C. Chaudhuri in New Statesman, all from London; Walter Galton of Sun Herald, S.S. Richardson in the Canberra Times, Australia, and the columnist Madam Madeleine Van Biljonin in Sunday Times, and Charles Barry of the Star, both published from Johannesburg, South Africa. R.E. Hawkins in Times of India and Nirad C. Chaudhuri. are some of the reviewers. Many of the reviews are illustrated with drawings and pictures of tigers from the book.

U.S. & Finish Editions

The book has also been published by Simon & Schuster Inc., New York and although the reviews are still to arrive, they are said to be outstanding. Jeffrey R. Short JR, Trustee of the Chicago Academy of Science in a letter to the author has written:

"I was fascinated by your experience with tiger and just finished your marvellous book which has just come out."

Clayton F. Freiheit, Director of Denver Zoological Gardens mentions "a definitive work which superbly combines scientific information and excellent photography presented in popular readable style"

The book has also been published in Finnish by Otwa Undermaakata, Helsinki. It has been well received in Finland.

The book is also being published for Grade Schools in Collins English Library Series in June 1980 and set for publication in Japanese this summer from Tokyo.

Wild Life Preservation

No book on conservation, in recent times, has received such an unanimous applause in the world press as this book, **Tiger !** by Kailash Sankhala has. The Wildlife Preservation Society of India sponsored Shri Sankhala's Project to the Jawaharlal Nehru Memorial Fund which awarded him a fellowship to undertake an ecological study of the life of the tiger. The book is the outcome of that perspicuous research work. The Cheetal has, therefore, decided to review the reviews of this book for better appreciation of world opinion by its readers.

Reviews in U.K.:

It would be appropriate to start with the Guardian, London, which published Simon Winchester's "Shooting down paper tigers", and criticised the Project Tiger, India and levelled charges of misappropriation of funds and inflated figures of success of the Project against the Project Director (Kailash Sankhala). It went to the extent of giving latter's departure from the Project a dubious name of resignation. The Guardian, I feel, has maintained the high tradition of British journalism, not only by publishing promptly the rejoinders to Simon's biased article which had generated more heat than light, (It was described as Simon Winchester's Crooked Mirror-Cheetal Vol. 19 (4)), but also by being almost the first to review Sankhala's Tiger! by David Mac Donald under 'Save or Destroy'. The reviewer writes "Sankhala presents data from his long long study of Indian tiger and historical review of man's vendatta against this magnificent cat". Agreeing with Sankhala Mac writes, "Indeed, the diversity of animal life he describes does much to redress the the rather unfair emphasis recently given to African wildlife. Sankhala's attempts to marry such diverse interests is ambitious". In the reviewer's opinion the author has succeeded with much of interest of the wildlife enthusiast, the environmental politician and the student of carnivore behaviour. He compliments Sankhala for correctly accounting his sample size and sources for the benefit of the serious students and for bringing home the fact that much of conservation is diplomacy. Mac quotes "but one must sympathise with any one who treads the rocky road between natural history and diplomacy which leads to effective conservation." The reviewer could not help referring to the newsy but biased and unfounded opinion of Simon Winchester.

About the illustrations Mac comments, "The book is illustrated with many splendid photographs. Tigers are impressive any way, compared with back lit Langur monkeys or a herd of chital deer drinking by night. They make pictures sufficiently original to confirm the author's dedication to photography".

The Economist, London:

The Economist, quoting poet William Blake, explains why tigers always had their admirers and credits Sankhala for playing the aristocratic card to win the support of the Prime Minister of India, Mrs. Indira Gandhi. The observations made by Sankhala are described as 'impeccably measured and accurately— often humorously— described'. The author is said to have obsession for tigers and to make an obsession understandable to communicate a love so unwordly r e presents a genuine literary achievement' comments the review.

I do not think I can communicate the views of the reviewer without full quotation from the Economist— "This book, by turn scientific and romantic is by the world's leading tiger lover. It is obsessive, odd, entirely fascinating and for all its oddness beautiful". The superlative used for the author's photograph's is "stunning", and finally the review has recorded the last word of praise, "Whatever happens to the species it will have this (book) strange memorial".

How valuable is the review in the Economist, is well known. It is a place of honour. It has been correctly expressed by Bhagwan S. Gidwani, author of the best seller "The Sword of Tipu Sultan", and presently Civil Aviation Adviser to PATA—

"How pleased and proud I was to read the review in the Economist. It was great to read this review. I know it for a fact, the reviews in the Economist are rarely generous.

If ever it gives praise, it is extremely restrained. I am, therefore all the more pleased that it should have said so much in favour of your book. ..."

It is creditable that Tiger ! was reviewed within weeks of its release in full page ahead of a long waiting list of best sellers. It is perhaps the first book by an Indian to be reviewed by the Economist in the last decade and the first on the subject of wildlife ecology.

Daily Telegraph

Though all reviews are in prestigious newspapers and magazines and by leading columnists but Margaret Lane's "A smile on the face of the tiger" in Daily Telegraph is commendable—first for its apt title, and secondly because it takes precedence over the best seller "The Destroying of the President : The memories of Richard Nixon" published by Sidgwick-Jackson. Margaret in her almost two long columns brings out the salient features and profusely quotes the concept of total environmental preservation from the book. She credits Sankhala for bringing out India's change in the attitude to the tiger. She also explains Sankhala's criticism of the Zoos and the gimmic of the zoo Directors. "His knowledge and observations are remarkable, his book illustrated with stunning photographs, will surely convert the most obstinate reader to the tiger's cause" writes Margaret.

Oxford Mail

Bruce Campbell in Oxford Mail calls Project Tiger as an emergency Project for saving the tiger from extinction. He feels "The book is much more an autobiography of the author, who has made himself into a first rate photographer. Some of the colour illustrations of game of all kinds superbly reproduced, are among the best I have ever seen". His adverse comment is that some of the drawings are heavily over inked in printing.

The observer

The review in the Observer by Cristopher Wordsworth designates the author "as a kind of honorary tiger himself by way of expiration, studying them devotedly and even sharing his domicile within gentlemanly manners of the species". According to Wordsworth the book celebrates the whole gamut of Indian fauna from the white tiger of Rewa with their icy blue eyes to the myriad Flamingoes of Kutch. The comment that Sankhala's fiercely proprietorial hypothesis of tigers territorialism makes no reference to Charles Mc Dugal's work in Chitwan Game Reserve in Nepal, is probably not correct because these are simultaneous contemporary publications.

"In his fascinating 'Tiger' Kailash Sankhala tells the story of the Indian tiger" writes Oldham Chronicle and adds "There are some absolutely gorgeous illustrations in both colour and Black & White". The book is termed as 'marvellous'.

The Times, London

Jan Morris in the Times, London thinks "to say that he is a tiger addict would be a preposterous understatement. He is an honorary tiger himself, and some of his descriptions of tigers in the jungle can move one like great poetry, so profoundly is he stirred by the beauty of their presence". According to the review, "Tiger! is a majestic book in its scope and dedication". Jan admits that she shied away from the book at first because of the hideous practice of tying baits but credits the author for "bravely trodding his own Damascus road and devoting his later years magnificently to the interest of the most awesome and patrician of our earth colleagues—the Indian tiger".

"The Beloved Beast" with sub-title "Indian and the Indian Tiger" is reviewed in Dorset Evening Echo with the rare remarks, "not one word or picture of which is too much... It is absorbing, by a man who is himself absorbed". The review comments on author placing tiger and man at the same level and raised a question "Who is being flattered?" I would say man.

Dalkeith Advertiser considers Tiger! a true book of a tiger addict and rates it as authoritative, exciting and beautifully illustrated telling the story of the Indian tiger. In Northern Echoes the book is termed "As majestic as the beast, it both venerates and explains. Even allowing for the stature of his subject, the colour photography is superlative". It calls the book "as an interest on his debt to nature that Sankhala now pays". Southern Echo reproduced the picture of Guard Tiger and comments "the Guard Tiger! reflects the life of a man whose expertise in the subject led to his appointment as head of an international Project to save the tigere from extinction".

Evening Press, Dublin

According to John J. Dunne in Evening Press, Dublin, the book "is a worthy tribute to one of nature's most majestic animal". In Evening Eco, Basildon the book is reviewed by Drew Smith in two columns with a photograph of Guard Tiger! "The wonderful book is packed with fascinating little details". Smith records "Sankhala's love of the tiger shines through the facts and figures and his family has adopted a tiger of their own. For hundreds of long nights he has sat in his hide waiting for these animals to appear". The reviewer concludes "He has studied more tigers than possible by any one else in the world. Their rarity is seen in ambition to photograph 100 tigers in the wild. So far he has managed to take only 43, many of which are reproduced here along side some lovely line drawings".

Oxford Times credits Sankhala to be well qualified for the job, being head of the Delhi Zoo and a tiger expert.....'He has immense experience of the tiger who has written Tiger! with both enthusiasm and expert knowledge. Northern Evening Despatch comments, "the book is not only a detailed study but also a good adventure story". "The author once shot a tiger for which he paid penance by later leading the world campaign to save the animal as species" writes the Despatch.

Gremby Evening Telegraph in its one long column describes hunting records of the British Raj and the change that has been brought through the efforts of men like the author in favour of tiger. 'Sankhala's love of this truly noble beast is the most inspiring aspect of tiger !, a superb book at once a definitive study of an animal and a personal adventure story, like others in this review, it makes excellent holiday reading'.

Sunday Telegraph

In Sunday Telegraph, the book is reviewed by Duff Hart-Davis, "Few authors can deploy such a marvellously thorough knowledge of their subject as Kailash Sankhala wields in tiger. Not only does he describe their lives in a way that is affectionate yet properly detached. He is also excellent at explaining the part they play in their natural environment. The author's accounts of tigers hunting, killing, mating and going about their business are done with memorable clarity", writes the reviewer. Davis appreciates much the interesting material called from old records of tiger hunting in the days of British Raj and the first class photographs which enhanced the book. Quoting Sankhala, "the tiger is the spirit of the Indian Jungle" Davis gives the final comment, "few men have done more than Sankhala has, to ensure that spirit's preservation".

Magazine & Journals:

Coming to the professional magazines, let us take WILDLIFE August 1978. Describing the tiger as fascinating species having mystery inherent in its nocturnal way of life, it welcomes "The Tiger" as a splendid addition to the existing literature and enthralling reading. Comments on the author are "Sankhala probably knows more about tigers than any one". The WILDLIFE warmly recommends the book.

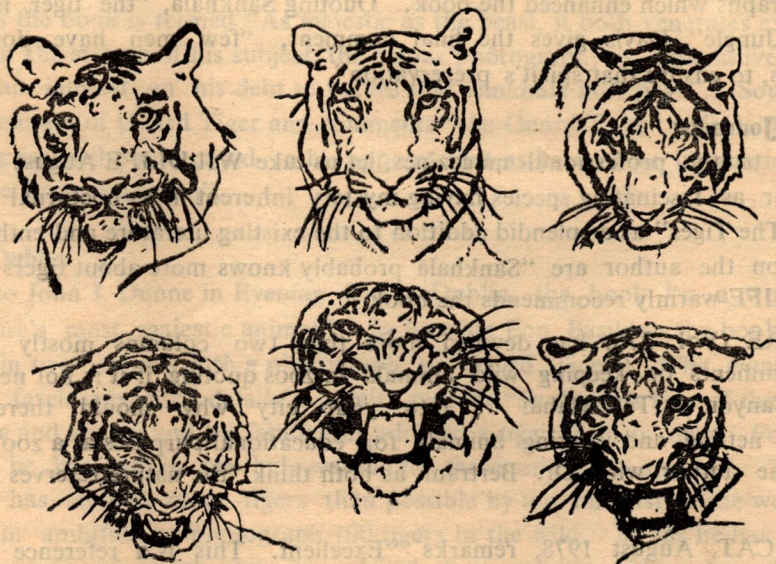
NATURE (Vol. 276) has devoted more than two columns mostly supporting the author's comments on keeping wild animals in zoos quoting 'if it is not necessary to bring the Grand Canyon or Taj Mahal into your city why should there be any justification for netting and snaring animals for educational purposes at a zoo?' The journal compares the author with Dr. Bertram as both think "the nature reserves as alternative to zoos".

WILD CAT, August 1978, remarks "Excellent. This is a reference work for every student of the cat family. Personal observations in the field are particularly well described

and line drawings (taken from photographs) useful in illustration of the text. The colour photographs are excellent and in this respect could only be improved by the addition of a series of colour plates, specially illustrating each such species". The journal refers to large numbers of photographs taken by the author and hopes "a publisher, possibly Collins, will make these available through the medium of another book".

BLACK-WOODS Magazine of September 1978 reviewed the book in almost two pages, describing the salient points of the work from fight for saving the tiger, behaviour of the tiger and success of the Project Tiger. The argument of change of name of the Corbett Park to Champion Park after the famous wildlife photographer is well brought out. According to the review, "it provides some of the best available information about every function of the tiger's life. The author's colour photographs are superb, but the line drawings are less satisfactory as a whole".

Column on ART & NATURE of the Western Daily Press, Bristol reviewed the Tiger ! in its opening column No. 1 with the author's photograph with his pet tiger Jim. "His book is crammed full of information about the tiger but Sankhala's method for obtaining it might well stick in the well mannered crew of the average English wildlife enthusiast.....His book is a fascinating document, superbly illustrated with his own pictures and deserves a place in the book shelves of any one concerned with wildlife conservation", commends the reviewer.



Six faces of the tiger moods.

The column agrees with the author for live baiting to obtain information, 'the ends justifying the means'.

NEW SCIENTISTS featured a critical note by famous columnist John Tinker when the Project Tiger started, in Vol. 61:No.891/28 March 1974, with doubts about its success. It reviews the book in a full column giving personal details of the author and the causes of decline of the tiger population "The book is based on careful records and measurements and photographs of tigers obtained during many nights spent in hissing hides, armed only with a camera. All the literature on tigers from the Mauryan and Mughal Emperors to Pocock and Jim Corbet has been exhaustively studied. With such information and that called from the very accurate records of 'shikars' kept by the Maharajas and other hunters in the time of the 'British Raj' the author has been able to estimate the former numbers and range of tiger populations", writes Mr. R.N.T.W. Fienner. "Though he has knowledge of environmental sciences, Kailash Sankhala's approach to his theme is more than that of a 19th century naturalist". Further 'Tiger is an outstanding book, written in simple and easy English, illustrated with excellent pen and ink drawings and by numerous photographs'.

Both black & white and colour which are surely unique. The reader must excuse numerous and lengthy digressions from the subject 'tiger'. For a book of such importance and so handsomely illustrated, the price of £ 7.95 is not high" are the final notes of Mr. Fienner.

Reviews in Australia:

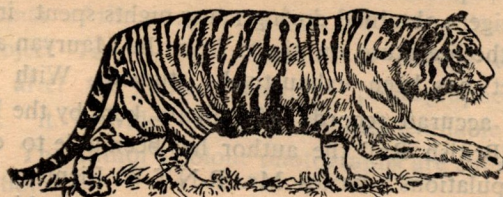
In Australia's Sun-Herald September 10, 1978, Walter Galton reviews the book under "Treed by a tigress and an elephant came to the rescue". It is a full page description of the book and a photograph of a white tiger awing and thanks Project Tiger and 'the efforts of men like Kailash Sankhala' for saving the species from extinction':

Richardson, S.S. reviews two books in the Canberra Times as 'Hopes for tigers burning bright', with two illustrations of tigers from Tiger ! with the remarks— 'The book is, however, the whole story of the Indian tiger rather than simply an account of its salvation'. Richardson interestingly quotes Chairman Mao, "If there is no tiger in the forests monkey is king". I do not know its political application and implication, but yes, ecologically it is true. Clubbing the two books the reviewer writes "These are two very satisfactory books, easy to read, beautifully illustrated and informative. Either of them would make a good Christmas present because they offer hope for the future of many species of the animal kingdom where previously there was despair."

The other book in reference is Guy Mountfort's "Back from the brink". Both Sankhala and Mountfort are the primary crusaders to save the tiger and I am happy that the Canberra Times chose to review them together.



Sighting prey



Stealth walk for closer approach



Stops to watch, focus and assess an attack



Ready to trigger attack



Attack

Reviews in Africa

Now we turn to the third continent to study how *Tiger !* has been received in the land of lions. "A tiger addict speaks out" is the title of Madeleine Vanbiljon's review column in the *Sunday Times*, Johannesburg. She describes the work to be an 'exciting study of wildlife', and further comments in her two and half columns that 'it is a valuable, authoritative, even exciting study of Indian wildlife'. She observes, "In the past decade or so we have been bombed with books about animals so exclusively African that a visit to a book shop might leave the impression that wild animals exist nowhere else on earth. The passage to India offered by Kailash Sankhala will correct the impression". Madeleine appears to have been charmed by our charming tigerman even without seeing him. She writes, 'But, so far as I know, we have no comparable book persuasively written, beautifully illustrated, ethnologically correct by a man who was there from first to a desperate last'. She disagrees with Sankhala only on one point that killing by Duke of Windsor of 17 tigers in one week and 1707 by Maharaja Sarguja to protect domestic animals of their subjects. I may assure the reviewer that hunting tiger was erroneously so.

"Hold the tiger" is a popular title of a photography advertisement like 'Tiger in your tank' of a Gas Company. The title is repeated in the *Star*, Johannesburg. Charles Barry describes the book, "This is one of the many facts of this absorbing book, so beautifully illustrated with the author's own photographs. It is a complete and convincing document on the world's most feared and sought after cat by the former head of the Project Tiger who showed how to save them, not to kill them". The reviewer has agreed that there was a time 'when to be called a shikari set a man apart as some one to be greatly respected—no matter that he was making a fortune'. Concluding he credits the author "Sankhala is proud of that work (Project Tiger) and he should be proud of this book too".

Earlier the *Star's News Flash* commented, "Tiger ! the first complete account of the Indian tiger combines previously unknown material about the subject and the author's personal experiences. Fascinating and profusely illustrated."

"Portrait of a jungle lord" is one and half column review of the *Tiger !* by Hans Mincliam in *Advertiser*, Adelaide, South Africa. Hans begins his review with a citation from the book "The tiger is the spirit of the Indian jungle. Even his distant roar.....changes the whole atmosphere". Important information has been given in the review about the tiger's ecology, quoting "Sankhala's book contains much on tiger ecology. It is well illustrated with numerous plates in colour and with black and white photographs and drawings. It is a book not only for the naturalists and conservationists; Sankhala's account of a creature of hypnotic power and fascination cannot fail to interest the general reader".

Unsolicited Letters

A name, Iain Howiee, will not ring any bell for he is not a known person even in his home town Salisbury, Rhodesia. He writes to Sankhala, "I can start off by saying that I have just finished reading your book, in fact I have read it twice and found it to be a most enjoyable book. I feel that I was actually present when you encountered the tiger. Your descriptions of the tiger, the other animals and the beautiful country in which you live are very vivid. I just have to close my eyes and I can actually see it all happening". This reflects the appeal that the book has even in the kingdom of the lion.

Reviews In India—at home

Times of India

In India—the home of the tiger about which the book is written by an Indian conservationist has been reviewed only by the times of India, the Hindustan Times and Business India. 'A Tiger addict's tale' appeared in Sunday Magazine of Times of India, almost full page by R.E. Hawkins. The review begins with 'It would be hard to find any one better qualified to write about Indian wildlife than Mr. Kailash Sankhala'. It gives exhaustive details of the author's scholastic description of the ecology of the tiger and the tiger land and can communicate his enthusiasm. The reviewer quotes from the book, "When I close my eyes I see the nests of half a million Flam.ngoes in the rann of Kutch, the carpet of a million flowers in the Himalayan meadows, the deciduous forests in late February with the extra-grnt reds, the lushness of the evergreen rain forests. I see shaded brooks banked with ferns, with frolicking deer coming down to drink or a tiger sleeping half-submerged in a pool unaware of my presence. In spite of some inevitable moments of sadness or frustration, when I look back over the past half century, I feel I have lived one glorious day after another, watching the splash of a colour of the setting sun, hearing the alarm calls of chital and sambar warning of the presence of a predator prowling in the night". Hawkins commends the pictures and the drawings as the best feature of the book including the colour plates which are 'superb' and a fascinating double spread entitled "The tiger at the apex of the biological pyramid". Then there is rather an unplaced lengthy note on the controversial IUCN/WWF Report about Project Tiger. Also the author's comments about Jim Corbett and Paul Leyhausen appear to have not been liked by the reviewer. Rather unfortunate is also the 'bold box' with the review based on Simon Winchester's biased article which attempts to make it a political issue referring to claims of Project Tiger as Emergency excesses. This may be journalistic style to attract public eye, to read the review. If that is so, I repeat—"Ends do justify means" the box is apt. Hawkins appears to have been moved by the author's descriptions which make the book 'compulsive reading'. He gives an example—"Recently in May 1977, at Sariska, I saw a Sambar doe and two fawns sitting in an ash-patch absolutely unconcerned while a tigress and her full grown cub fed in full view hardly a hundred yards or so away. Animals know that the tiger unlike man, is satisfied

with what he has killed for the day and is not concerned with tomorrow. He takes only what he needs and does not kill for the sake of killing. There is a perfect understanding between predator and prey. I felt ashamed of being a man, who is not trusted even by the jackals, much less the deer and antelopes". And finally according to Hawkins, "This book will open many eyes to the beauties of nature and the necessity for total environmental protection in some areas".

But why did the reviewer choose to review two books together, the other being the "The face of the Tiger"? He has not done justice to either. I feel it is more a dis-service to Charle Mc Dougal who has been praised in the review, for they are not comparable in text, information, scope, style, in colour plates, drawings, reproduction quality and even prices. Tiger ! is priced only Rs. 60 as against Rs. 95 of the 'Face of the Tiger'.

The Hindustan Times

"Spirit of the jungle" in the Hindustan Times Weekly, Sunday by Vepa Rao goes a step further in reviewing three books together. Of course, the leading one, in two column review with a picture, is Sankhala's book. Rao writes that Sankhala's book is the product of a life time's experience but adds that author's conclusions are based on limited evidence and further support himself (reviewer) quoting Sankhala, "None of us would claim that we know the last word about the tiger"—The quotation is some what out of place and without reference to the context. But Rao credits Tiger ! "exquisitely illustrated and written in a disarmingly straight style, the book succeeds in transporting the average reader to the wonderland of tigers, as well as Sankhala's comments on skin trade, zoos and the controversial Project Tiger merit the attention of both the public and the authority". What Mr. Rao means by 'controversial Project Tiger' is best known to him. If there was any controversy, it was creation of a few perverted minds who could not feel comfortable when a massive conservation project was undertaken by the Indians exclusively as an Indian venture and a bold political decision of "poor" India. The lingering trace of doubt have been removed by the International Symposium recently held at Delhi where songs were sung in praise of the Project Tiger as the leading torch of conservation in the world, by all including the critics like Paul Leyhausen. There is no parallel in the world in dimensions, approach, efforts and successes particularly in the Indian context, where tiger is certainly not on the priority list. Sankhala had certainly to do a lot with initiation, planning, documentation and execution to its success. That is no denying.

Business India

Business India's reviewer Rina Kamath appears to have been hypnotised by the Tiger ! According to her Sankhala succeeds in conveying a rising sense of excitement and occasional suspense as he explores the mysterious world of the tiger. She quotes passage of

'heart-stopping excitement and occasional dramatic suspense'. She comments on the style of the writer as an easy, chatty, yet precise, shifting emphasis variously from startling revelation to expressions of serious concern, to fact heavy information, to wryly humorous observation. She compares the writer to an artist. The strength of the book is in the totality of the picture that finally emerges after 'staining his final sweeps of colour' progressing to finer details to achieve richness, depth and dimension'. Rina writes in contrast to the vibrant first section the second part of the book settles into calmer, tough hardly less interesting narrative and comments..... to round off a pleasing and comprehensive education on the tiger in India.

'Astonishing Beauty' is the title of her description of illustrations. 'Practically every other page is visually relieved with excellent tracings of photographs and imaginatively planned charts that are compliment delight. And finally, full marks to Sankhala, the photographer for his colour plates of exhibition quality'. 'One would be hard put to find a more qualified writer on the subject of this truly gripping 'book' she considers. She concludes 'This book is a giant step towards understanding the importance of the tiger, the supporting cast in the animal kingdom and indeed of the ecosystem itself'. She wishes that Sankhala's labour of love will not prove-one hopes-to have been in vain.

Sunday:

SUNDAY serialised the book in three issues with the comments 'fascinating study of the tiger'. To lend the desired credentials to the serialisation the Magazine reproduced Nirad C. Chaudhuri's review from the New Statesman, London. This is a special review by a special man and I will take it up a later.



Tigress—her two cubs suckling.

Financial Times London

Let us see what the Indian living outside the country feel about Sankhala's work. Kr. Natwar Singh, presently our High Commissioner in Zambia, reviews the book in Financial Times, London. His opening remark is 'the present book is a major work on the Indian Tiger, more lively and better documented than most on the subject. The book is a laudable, well researched and informative one. Natwar, as affectionately he is called, remarks, "Mr. Sankhala comes from Rajasthan. He is obviously an 'original' character, who has passionate feelings about the tiger and its preservation. One is tempted to speculate what he could do if he saw 'tiger mauling a man'. Then the reviewer mentions about the impressive credentials of Sankhala as Game Park and Delhi Zoo Executive Director and the author's excellence in wild life photography who has particularly watched various moods of the tiger. No one has mentioned the basic background of the book except Natwar that it was the prestigious Nehru fellowship which gave unlimited opportunity to the author to undertake a definite study of the Indian tiger. He also writes about the bold political decision—the support that Mrs. Indira Gandhi gave to the Project Tiger. He does not forget to mention that Sankhala has his detractors who have questioned his claims of the success of the Project Tiger and his methodology challenged. I agree with the reviewer. It is Sankhala's style of functioning that creates less friends specially the professionals. This happens with all 'original' characters. Natwar credits Sankhala, 'but there is no getting away from the fact that he was to some extent responsible for starting a national debate on the subject. This is not an insignificant achievement. His book will no doubt be a success. It deserves to be'".

Nirad C. Chaudhuri:**New Statesman, London**

Now I come to that intellectual giant of a man we all know—Nirad C. Chaudhuri. He opens his review "This is one of the very few monographs on the tiger which has been written from first-hand observations", in the New Statesman, London. Chaudhuri's surprise is justified that in view of the place the animal has held in the natural history of India, in popular imagination and in the minds of big game hunters, Sankhala's book is the only work solely on the tiger". In his opinion 'Tiger! therefore, fills up a regrettable gap in our knowledge'. Nothing escapes Nirad's eye, not even a proof reading mistake. He points out the failure of the publisher on page 133 where figures got reversed: instead of 1875 the figure is wrongly printed 1857, the year of the mutiny. He regrets that Sankhala is sadly misinformed about the suffix 'Royal' originating from a tea-planter's shoot. He holds colonials responsible for many Indian Nationalist myths. Writing full one and a half column he recalls his meeting with the author, and latter's clash with Jim Corbett almost of a scepticism but supports the author as many other observers including F.W. Champion, have also agreed that the tiger rarely turns a man-eater. Nirad Babu compliments the book—"It provides reliable information about the history of the tiger,

and will not only be indispensable for the specialists but also absorbing for any one who is interested in wild animals. All the information on the zoological side has been gathered by Mr. Sankhala from prolonged observations. The book also gives expression to the fervour of its author for the tiger. Another of its most attractive features is the series of illustrations, many of them in colour, reproduced from the photographs taken by the author himself". Chaudhuri's final appreciation, "both personally and on the behalf of the Indian Government, Mr. Sankhala made efforts to save the tiger for which he deserves the gratitude of all who love wild animals and a fine heritage of India". I feel Sankhala is a rare individual specially an Indian to come up to such high esteem of the man, we all know is highly critical of any thing including religion and history.

Comments

When I spoke to Shri S.K. Seth, a legendary forester, who retired as Inspector-General of Forests and who was Sankhala's immediate boss, about this book, Shri Seth summed up by saying "Such a book has not been written nor is likely to be written in near future".

Since much has been said in praise of the book, I need not indulge in making repetitions. However, I would like to point out that a book of such a life time work should have been enriched with more colour and black and white photographs and some of the drawings like the tigress and cubs, and elephants wallowing displayed over double spread. Sankhala is known to me and the Society for the last two decades. His inspiring involvement and outspokenness are reflected throughout his book, *Tiger!* He is a single individual who by his research and crusade to save the tiger has become an integral part of the history of the species.

In Author's own opinion:

While concluding this review of reviews on the *Tiger!* I deemed it to be in the fitness of things to ask the author of this work—Kailash Sankhala, his own opinion about the book. With an obvious sense of satisfaction Sankhala said, "I may, at the outset and with pardonable pride, state that the book has more than achieved its purpose. The gigantic exercise undertaken by me has been fruitful and rewarding indeed. When I wrote this book, the test which I had in mind for measuring its success was what and how much will it be able to do for the tiger. And it is gratifying to note that the book has been able to successfully generate an awareness about and enthusiasm and concern for the conservation of the tiger all over the world".

The book is among the 80 books of the year (1978) with Christopher Wordsworth's remarks "*Tiger!* transports one into the secret world of our most splendid and fastidious carnivora and glows with a hopeful spirit of conservation". In the *Observer*, there is really 'a smile on the face of the tiger'.

R.N. Misra

Comments on "The Kheri Maneaters"

by Choudhary and Sinha

By

ARJAN SINGH

A study team of two Field Directors of Project Tiger was appointed by the Government of India to study the incidence of cases of maneating in the Dudhwa National Park, and other areas of the Kheri District outside of the Reserved Forest. Their objective according to the report was to remove the most sensitive socio-ecological conflict between the local man and the confirmed maneater. Further on, however, it becomes clear that removal of this conflict is synonymous with the removal of the Tiger. I submit that such an unequivocal statement is a dangerous one, considering that, census figure in non-Project areas are open to grave doubt, whereas figures, even for Project areas need independent verification, as the status of the tiger has now become a status symbol for the Field Director.

The census of 1979 in the Dudhwa National Park was conducted by untrained forest and wildlife guards, who produced tracings of 240 pugmarks. Some of these had five toes. These tracings were submitted to the Assistant Park Director who then worked out an ad hoc figure of 51 for the Park of 490 sq. km. No Wildlife Officer was present during the censusing operations. Such methods presumably prevail in other non-Project areas. The figures for Project areas are in themselves suspect.

Schaller in his Lion study in the Serengeti National Park over a period of 4 years in a core area of 1500 sq. miles has postulated an increase of 5.5% per annum for a predator with the social insurance of pride protection. Lion population densities have been known to be as high as one per 1-2 sq. miles. Such figures are impossible for the solitary tiger, yet an overall increase of nearly 25% per annum has been registered for all the project areas. Some individual areas have an increase 50%, and though the Project areas have been increased in size such a population surge needs investigation. Corbett, which was supposed to have reached 'saturation density' in the sixties according to S.R. Choudhury, and inspite of having lost 85 sq. km. of its best tiger habitat to the Ramganga dam has registered an increase of nearly 12%. The tiger population of India as a whole has increased by almost 6% or more than the lion in the Serengeti National Park.

I am, therefore, of the view that modern methods of immobilisation and translocation should be used in preference to the archaic and final means of destruction recommended as ad hoc solution in all cases of human-animal conflict without a study of the cause of this aberrant behaviour in case we suddenly find that we have a fewer tigers than we previously thought. The tiger is basically afraid of human beings for like all animals they are shy of the unknown and the unfamiliar. Man is not their natural prey for his world

is of the night, whereas the human goes about his avocation in the day. He walks upright, wears clothes, talks loudly, and is generally in groups. But basically the tiger is the master predator and when force of circumstances and hunger has compelled him to wander in the day in areas surrounded by humans, the familiarity which breeds contempt is not long in coming. Such conditions are going to occur as increasing human populations continue to impinge on diminishing habitat areas, and I may state here and now that unless Tiger habitat is accorded a sacro-sanctity free from biotic interference this one sided war of attrition is going to continue.

Apart from the biotic disturbances which take place in most forest areas, it should also be appreciated that sugarcane is an extension of habitat when grown next to forest areas where no disturbance takes place till harvest time, and some attempt should be made to create a buffer zone free of this crop.

The cases of man-eating are in two sections. Those which occurred within the National Park and those which occurred in cultivated areas or forest areas outside the park. Due to the fact that no local Forest Officer, or individual was associated with the study in the short time that was available, the team appears to have relied largely on hearsay, and local gossip which is invariably exaggerated when dealing with a secretive and potentially dangerous animal as the Tiger.

I was in continuous touch with the activities of the so called Satiana Tiger.

The first kill took place late in the evening of the 2nd March 1978. As I visited Sathiana next morning, I went to the place of occurrence. The labourer had gone to relieve himself under a bush as was evident from his blood stained lungi lying on the ground. He had been killed, in error, by long Toes, one of the males which shared the range with Tara's Male between Dudhwa and Kawaghatia. He dragged the body for about 20 yards, but did not make any attempt to feed. On the approach of the search party he abandoned the carcass and killed a bullock near the camp. He did not maul a second one. The accident took place because an encampment of about 200 bullocks, carts, and cartmen, belonging to the Forest Corporation had been stationed in prime Tiger habitat for the last four months. I wrote to the Chief Wild life Warden that it was surprising that an accident had not taken place sooner. The killer was a big male known to me and certainly not a young animal.

The next three cases involved a big tiger whose range was the catchment areas of the Nagrol and Neora rivers. His range covered the area from Ambargarh to Kiratpur along the Nepal border which had been deforested by the Nepalese over the last two years and settled with ex-soldiers all having firearms. They had not only decimated wild prey but

also used to intrude into Indian Territory. Three cases of genuine man-eating took place, and I was able to reach the scene of each occurrence within a day.

In the first instance a lone Nepali penetrated about 3 km. inside the Indian forest on some errand. He was killed on the banks of the Nagrol by a large tiger late in the evening. A tigress and two cubs also visited the site of the kill, and though the cubs probably had not been weaned there seems to be little doubt that the tigress also fed. It was also likely that the tigress and cubs were headquartered in the area. The relatives of the Nepali removed his ribcage.

The second case occurred within a km. or so of the first kill. Once again it was a lone Nepali inside Indian territory. The killing was done by the tiger but the tigress was also present, and on the third day there was no trace of the kill.

The third killing was a Tharu from Kiratpur and about 3 km. from the second kill. It is unexplained why he was in the forest although there was a rumour of a fire in the forest I did not find trace of one. The man was supposed to be simple. The tiger was once again the killer but on the second night the tigress dragged the kill and I found only the tattered head on the third morning. This was a big tiger and was seen by a large number of people including the Chief Wildlife Warden and the Park Director. With the local paucity of wild game he was contrary to popular belief, killing for his family. Thereafter the Forest Department took to tying baits at the Neara river bridge. These kills were utilised by both tiger and tigress, and by the time of outbreak of the rains the period of stress of the family had passed, and there have been no more incidents. In the early winter of 1978 the tigress had two well grown and mobile cubs with her. This is a rare case in which a man-eating family had been weaned from a human diet by assisting at their time of stress, and there is no doubt that this can be done in favourable circumstances. The Satiana tiger was a myth as not only was the Nagrol tiger a large and adult male, but a trek to Semri and Dalnagar would have meant moving about 20 km through a water-logged area in a particularly wet season, and into an area with little wild prey species. This particular animal who made the killings was possibly washed down from the Pilibhit area during the heavy flood of 1978 and his unfamiliarity with the terrain led him to subsist on whatever he could find. An attempted immobilization was a Gilbertain affair when the untrained Wildlife Warden was issued with a single dart which he dutifully fired of at about 150 m. Needless to say the low pressure charge collapsed before it could reach the target.

The above account is a true version of the cases of man-eating which occurred in the Dudhwa National Park, and emphasises, if any emphasis is necessary that rules of conduct must be devised if man and tiger have to co-exist. As traffic light and zebra crossings are necessary at the crossroads of the concrete jungles, similar guidelines and rules of conduct

should be provided for areas in which tigers still occur, for wild existence is very fragile where man can wipe out the tiger but the tiger cannot exterminate the human.

Biotic Pressure in the Dudhwa national Park

Clause 3-35 sub cl 7, of the Wildlife Protection Act of 1972 prohibits the grazing of domestic stock in National Parks, yet the study team has suggested the controlled grazing of cattle which is desirable for the parks relationship with the local man. As is well known by the local authorities even if such integration were possible within the Act, it would not be possible to control the influx of cattle into the Park with its resultant hazards of forest fires and unwarranted intrusion under cover of the presence of locally recommended cattle stations. The southern periphery holds the main swamp deer population, and any attempts to introduce cattle grazing will perforce disperse the wild ungulates, as well as expose them to cattle born diseases.

The uncontrolled fire hazard is probably the chief deterrent to the proliferation of wildlife population as not only is the habitat degraded but forest fires from March onwards destroy avian populations during the nesting season as well as disrupt the activities of mammals which may be breeding at the time. Unfortunately, prevention is not entirely possible due to one hopes, temporary, intrusion of village concessionists and the existence of two public highways through the park and 'effective and immediate control measure will have to be resorted to, of which need, the Park authorities are increasingly aware. Unfortunately the study team has struck a personal note in their thinly disguised reference to pseudo-conservationists and their elementary allusion to fire as a constructive tool in the hands of the practising ecologist. However, if I can act as the Conscience Keeper of the Dudhwa National Park, I fear no Foe in Shining Armour or otherwise,

The commensalistic integration of the heavier ungulates into the grasslands of the Park is worthy of consideration, and every effort should be made through the Government of India to acquire a male and at least two female rhinoceri as a breeding nucleus for the Park from the swamps in Kaziranga. The other cases of man-eating have occurred in the South Kheri region or in the catchment areas of the Sharda River. I visited Gola and the Baraucha Nala scene of the first two kills of the Gola man-eater, where I found the pug-marks of a tigress which had killed a bait the night before. I was informed by the local Forest Staff that this was the man-eater. They also told me that there were other tigresses in the area. A forest lease holder also informed me that there was only one tiger known as the 'Sant', who had never harmed anyone. However as arrangements were being made to destroy the tigress, I ventured the opinion that the particular tigress they were pursuing might not be the man-eater. This suggestion was not popular with the local public and I was not invited to participate in further investigations. I, however, gathered later that

a tiger and tigress had both been destroyed, including I surmise the old Sant, neither of whom were man-eaters. The study report has given its opinion that the non-maneaters were shot because of the urgency to remove the problem. Such an attitude to the killing of innocent is most regressive as no tiger will be safe especially if the human is both judge and jury. Also the suggestion that these tigers driven out of their habitat by unnatural pressures are a resource which will hopefully revive commercial killing is a statement with disastrous potentials, but a commercial foresters reaction.

The Gola area of the Barauchcha Nala is surrounded on all sides by cane fields, farmer crops and firearms. Leaseholders and contractors operate within the forest. Large herds of domestic stock graze in forest areas, and wild prey species are increasingly scarce. According to the report the Kathina Reserved Forest suffers from the same defects except that there is more forest cover. Instead of declaring war on these hard pressed and isolated tiger populations we should try to remedy some of these inherent habitat deficiencies as otherwise with increasing populations and human intrusion it is merely a matter of time before all these animals are wiped out, or succumb to genetic failures. The IUCN recommended a genetic pool of at least 300 tigers in a contiguous area to retain a breeding viability. How long can the inbreeding of these isolated populations, described in the expensive prose of the report as breeding intensively due to the proximity of the male last? It is not only love that makes the world go round.

The whole of the South Kheri Forest complex is so biotically disturbed that the tigers are forced to seek refuge in cane fields adjoining the forests which to them are extension of habitat and undisturbed until the start of the harvest. Tigers are reacting to the continuous ravaging of their ecosystem, and if we are to save them for all time we must rationalize their living space. The tigers of Kheri are the pioneers of this explosion which is likely to occur wherever there are successfully breeding tigers. The only answer is dynamic Tiger Projects, rationally renewable after a planned lapse of time, until we have integrated the areas in which we hope to preserve the Tiger and his ecosystem into viable entities, hopefully to be retained in perpetuity.

The Chief Wildlife Warden of U.P. and I have been endeavouring to get these problem areas of South Kheri and Pilibhit included in the Tiger Project ever since the end of the six year period of the present areas expired. It is still my hope that these areas may be included in the coming Sixth Five Year Plan.

Though the mandate of the study team was the investigation of the problem of the Kheri man-eaters they have thought fit to pass strictures on my reintroduction projects for Tigers

and leopards. This has been done with incomplete knowledge, for at no time was I contacted by the team though they headquartered within a mile of where I live. Without any previous experience in the methodology of rehabilitation it has been pontificated. "No fanciful misplay should ever be repeated to captive breed and rehabilitate any of these super predators. Two boys were killed by panthers so attempted to be introduced into Dudhwa in the past. No super predator can be rehabilitated that way".

It has been my experience that all animals of wild antecedents after a period of dependence on human tend to revert to their own species if they are reared in their own environment. This tendency has been displayed in my experience with a tiger, leopards, wolves and fishing cat, besides chital and hogdeer among the ungulates. After that it is a question of the search for food by the predators. The predation instinct is an inherited one, and it merely needs a certain maturity, practice, and the hunger imperative to perfect the predator into the killing agent which nature ordained. Most predators of the feline genus are also scavengers when need arises. I can do no better than briefly narrate how my hand reared tigress compulsively opted for a free existence at the age of 20 months and ten days. A young male tiger had been lately attracted to the precincts where Tara used to be caged for the night, and after she attained the age of 20 months it was impossible to restrain her in her desire to return to the forest. I can only surmise that Khairi, the Orissa Tigress, is restrained by artificial means from returning to the forest, especially if other conspecifics exist there where she wanders during the time that she continues to move freely in open forest during brief periods under watchful studies.

Once Tara went with the young tiger in the vicinity, she did not return but it was obvious that she had transferred her dependence to one of her own species. She remained with this tiger for a year, and when he temporarily moved out of the range, she attached herself to the two other tigresses of the range. She is now a wild tigress of the Dudhwa National Park in her own right living on normal prey species. I have established her identity to my own satisfaction through visual sightings by me and people who knew her, by her range preference which still remains the same as when she opted for independence, and by photographs which unfortunately do not carry any visible distinguishing marks after nearly a year and three quarters of growth. She has been very shy but is getting more confident, and I am hopeful of getting more positive recognition photographs. Contrary to what lay observers imagine, a hand reared wild animal returned to its own environment displays an extreme shyness of man and not a desire to return to a former relationship. The tigress is not "Naturally Eliminated" or dead as so confidently stated in the report. I invite Mr. Choudhury to visit me when he comes in November. For notwithstanding differences in opinion I do admire his application and grasp of wildlife management principles.

The Government of U.P. have sponsored my leopard rehabilitation scheme. I started with a male leopard in 1971. It is true that this leopard mauled a child, but the boy died because political prejudice forced the local doctor to send him to the hospital in Lakshmipur where he died of neglect and maggots in his wound 14 days later. There were strict orders by me to my staff, and also a hoarding notice by the U.P. Wildlife organisation to say that women and children were not allowed at Tiger Haven and the child should not have been where it was. This leopard opted for free living at two years of age, and I have photographs of him taken about a year and a three quarters after he became independent.

Two females were presented to me in 1974. Two years later one was poisoned, as suspected, by the Forest Staff. The other also unfortunately killed a child. The hutments were surrounded by flood waters. The same restrictions of children applied and therefore the leopards were not to blame for accidents, as they were perfectly safe with confident adults.

My hand reared male who became wild, had two litters by the remaining female who because of extra precautions remained with me as semi-wild leopard. Of the first litter of two, one was killed by a tigress who had lost her own cubs, while the other was accidentally drowned in a flooded river when the mother was trying to remove the remaining cub from the scene of the first tragedy. The second litter only produced one cub, which was run over by a train when the railway was surrounded by flood water. The cub was a year old and had been independent for a month. These casualties were due to natural causes as pertain in wild existence, and were not caused by processes of rehabilitation.

I, therefore, claim that the reintroduction of predators is entirely possible if carried out with suitable precautions and sympathetic understanding. As this procedure may finally apply to the staff of Project Tiger, I do suggest that this possibility should not be rejected out of hand because out of a personal prejudice without an investigation of its feasibility. I am willing to loan the two manuscripts of my books on the leopard and tiger which hopefully will be published in 1980, for a further study of such possibilities.

General Remarks:

Unfortunately, the report is written with a hunters bias on destruction. On the one hand we have an international concern for saving the tiger and on the other hand we have a blanket recommendation to destroy all tigers who have of necessity taken to an alien diet, because as the report itself points out that their habitat has been so degraded and intruded upon and their prey species exterminated that they are obligated to turn to unnatural forms of prey, especially if they have cubs. Man is not their normal food, nor is man eating an inherited tendency. Once they are translocated to a closed environ they will forget the flavour of man because animals do not have long memories.

I am not advocating an attempt to save all these tigers. Inveterate maneaters should be expeditiously destroyed like any other hardened criminal. But I do appeal for considerations for the suckling mothers who have perforce eaten of man to feed their starving cubs because we have destroyed their homes. One pities the man with twelve children who had to die, but the newly born cubs of a dumb animal who died of starvation after three weeks also deserve a measure of sympathy.

Dr. R.N. Mishra

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(In continuation of article on Page 3)

Replies to the comments of Shri Arjan Singh on 'The Kheri Maneaters'

BY

CHOUDHURY AND SINHA

The weight of the paper is evident in its leading location in the Indian Forester, Vol. 106, No. 1 of the Forest Research Institute and Colleges, Dehra Dun followed by repetition in Cheetal Vol. 21, Nos. 2 and 3, the Journal of the Wildlife Preservation Society of India, Dehra Dun.

There could be no two opinions that a confirmed maneater has to be expeditiously removed. This is the deliberately emphasised resolution of the ISOT.

Experience has established that the pugmark census of the tiger with the help of Tiger Tracer is the only reliable method available. Like all cats, tiger has, admittedly, a very high biotic potential, evident from the short gestation period and adaptable parturition interval of multiple cubs in each litter. Average growth rate in a normal range may be the issue of several drag factors, conspecific and interspecific, and also of the range conditions and its various influences. Given a chance and booster to grow, as happens in Project Tiger and similar other areas where the tiger is protected, it does grow faster than can be guessed, irrespective of what anybody states about his empirical experience, subjective assumptions or specific studies, if any, including with sister species like in the lion of Serengiti, for example.

Regarding the so called disturbance and the factual adaptability of tiger, enough has been stated with objective data in the paper. Any follow up studies in the field with open mind would convince.

The Satiana maneater was definitely a young one as corroborated by all whom we met, including the Wildlife Warden and more dependably the local wildlife staff at Satiana. The behaviour of the maneater at Dal Nagar on August 1, 1978, and more daringly his

attack seven days later on Labh Singh bespoke of a boldness that was certainly acquired through experiences gained around Satiana. Such boldness would not appear overnight in the open crop fields near the tar macadon road, heavily used by vehicles and human beings.

Everything that I have predicted about the Gola maneater and her cubs has been proved in her carcass and subsequent event with her cubs.

The Sarada maneater who had grown up, first a suspected female to subsequently a male, based on the pugmarks had been predicted by me with great apprehension about its future in growing boldness and consequent danger to human beings. I had told that it was a big male with distinctive pugmark. On March 6, 1980 on the auspicious day when the Prime Minister inaugurated 'A World Conservation Strategy', I was told in the hall by the Chief Wildlife Warden, U.P. that the Sarada maneater, a big male, had at last been shot on his 5th human kill after my visit to that area. As had been anticipated by me, he had become so bold that the last kill, the 18th in his tally, he killed in the open field and started eating, ignoring the villagers who tried to shoo him away. Luckily the Wildlife Warden who had been camping nearby, keeping watch on the movement of that maneater, could immediately rush to the spot. He shot him while he was still eating the dead body in the open field.

The Chief Wildlife Warden also told me further that maneating incidence by young tigers are cropping up in a number of other places in the terais.

Once a tiger becomes confirmed maneater it would forfeit all considerations including of cubs at heel. Should there be any doubt that it should be so as ordained in the history of Kheri maneaters?

Khairi has gone out on her own and kept away from us in the forest, roaming all by herself. But she comes back. And while on her own she has met people and hugged and muzzled a number of them, at different times, some at the edge of the forest near their villages. In all these cases people greeted thus by the tigress, stood firm and quite often threatened her away. But just imagine, if any one of them had tried to wrench out and run. What would have happened?

I too have kept a number of lesser cats (*Felis chaus*) (*F. bengalensis*) and brought them up to adulthood. All of them have gone free leading independent lives in the nearby forests, but all of them have time and again returned to say 'hallow hallow' to us and get fed during lean days. No cat forgets association, friendship and love. No cat is mean.

The grown up cub of Elsa who killed his keeper, did it most certainly by accident. I myself have passed through many critical moments between me and Khairi, any one of which could have ended fatally for me but for my relaxed stance and sharp reflexes. These are the dangers, enough to inhibit, rather deter any attempt to reintroduce or rehabilitate a super predator.

A Simple Method for Capture of Live Lizards

BY

AJIT NARAIN SINGH*

Department of Zoology, University of Lucknow, Lucknow-226007

During an investigation of the Hypothalamo-hypophyseal neurosecretory system of *Calotes versicolor* a regular supply of this lizard was required. Its capture by long forceps usually caused injury and even death of small specimens. The noosing gun of Bertram and Cogger (1971), used successfully for capturing small lizards, is expensive and not usable by untrained field staff. For these reasons the need arose for a cheaper and simple devise for capturing this lizard.

One noose was made on either end of a long tail hair of the cow *Bos taurus*. One end of the noose was slipped through the end to an ordinary long stick and the other noose was allowed to hang freely. The animal was carefully approached and as soon as the noose was slipped over the head it was pulled. The noose tightened and the animal was thus captured.

The noose never lost its shape because the tail hair of *B. taurus* despite being fine is extremely sturdy. Nor did it strangle any specimen, large or small, during the daily collection. Incidentally, when the horses' tail hair was used, the lizards shied away; presumably the noose could be perceived due to the relatively greater thickness of the hair. As this contraption merges with the thicket on which *C. versicolor* lives and due to the position of the noose at the end of the stick the lizard neither avoided nor became wary of it.

Easy to fabricate, this devise can be readily produced even in the field in desired numbers. Unlike the almost ubiquitous tail hair of the cow, the nylon thread used in the conventional method (Stebbins, 1954), if lost in the field, is not easily replaceable. This devise is usable by even untrained staff and has proved effective in capturing both small and large *C. versicolor*.

I am thankful to Mr. V.B. Singh, Chief Wildlife Warden and Conservator of Forests, W.L.P.O., U.P. for facilities provided at Crocodile Rehabilitation Centre, Kukrail, Lucknow.

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*Present address: WWF Himalayan Musk Deer Project, Kedarnath Forest Division, Gopeshwar-246401.



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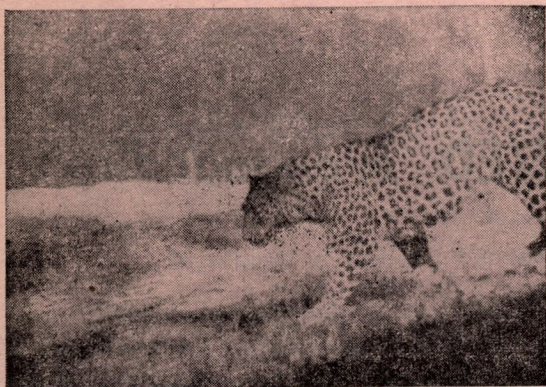
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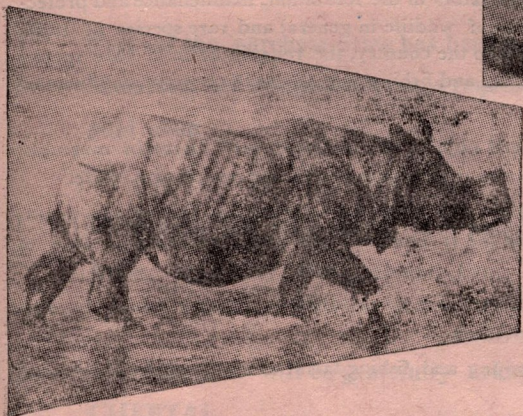
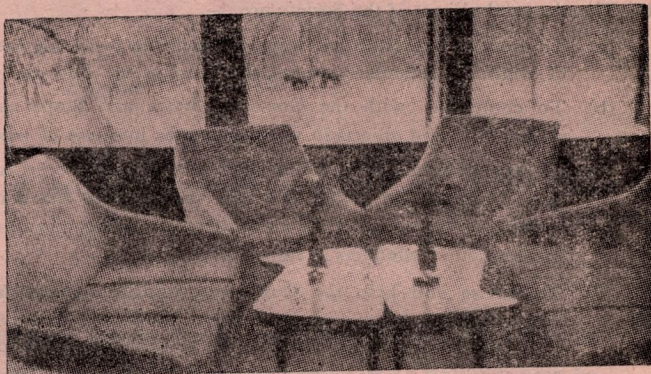
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- (b) To co-operate with the Govts. of India and States and with other Societies and Institutions having similar aims and objects in working for the interests of wildlife.
- (c) To assist in enforcing and actively supporting the Forest Acts, Wild Birds and Animals Protection Act, and Rules etc. of States and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detection and prosecution of offenders in respect of such laws.
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All correspondence may be addressed to:—

Mr. Harsh Vardhan

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Karnatak, Rajasthan, Gujarat and Madhya Pradesh are setting up sanctuaries for Bustards.

FORM IV

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PLATE III

PLATE III



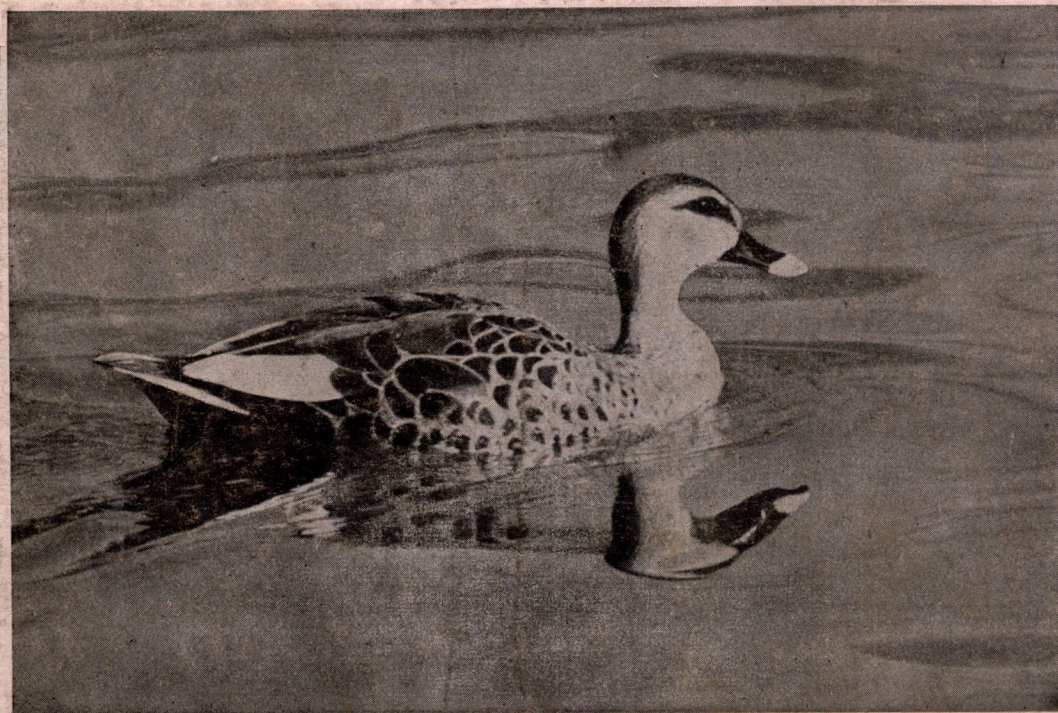
PLATE IV

PLATE IV

(See article on Page 3)



Siberian Cranes (Winter visitors)



(See Article on Page 49)

Grey Duck or Spot Bill.

Photo by E. Hanumantha Rao